VET MED

RECEIVED
APR 7
VET. MED. LIBRARY

OHIO STATE UNIVERSITY
APR 6 1961
LIBRARY

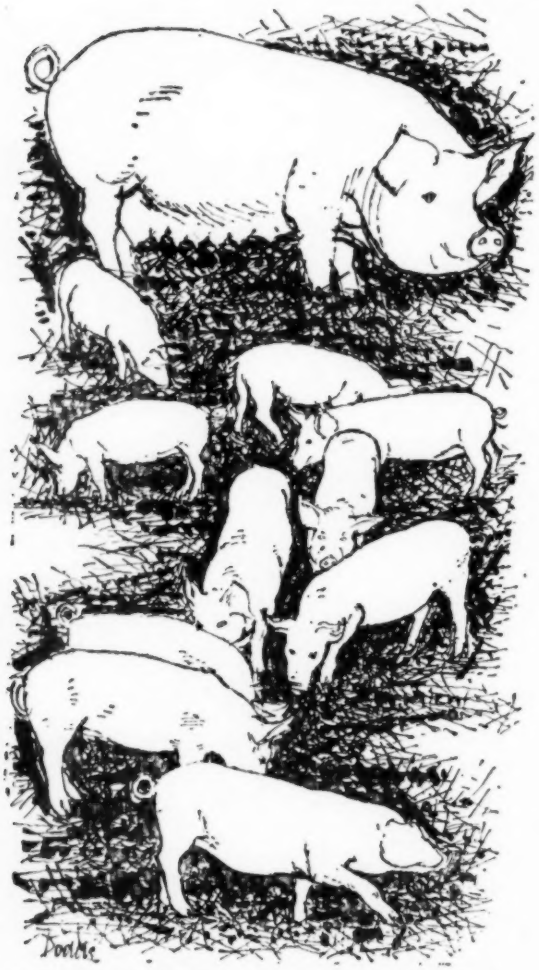
THE JOURNAL OF THE BRITISH VETERINARY ASSOCIATION

The Veterinary Record

PATRON: HER MAJESTY THE QUEEN

Vol. 73 No. 10 Issue No. 4320 229-256 Registered as a Newspaper

Protecting pigs



CRYSTAL VIOLET
SWINE FEVER VACCINE

The Behringwerke brand of Crystal Violet Swine Fever Vaccine is prepared at Marburg, W. Germany, from the blood of pigs artificially infected with swine fever, the virus being killed by the joint action of crystal violet and heat.
The dosage for pigs up to 70 lb. is 5 ml. and over 70 lb. 10 ml. The vaccine should be administered by a single subcutaneous injection into the soft tissue at the base of the ear.
Immunity lasts for 12 months.
When stored between 36° F. and 45° F. (2° C—7° C) the shelf-life is 12 months.
Presentation: Supplied in bottles of 50 ml. and 100 ml. Annual contract terms available.
Behringwerke AG, part of the Hoechst group, is responsible for the production of vaccines and antisera for both human and animal use.
Its experience in this field dates back to 1892 when Emil von Behring discovered diphtheria antitoxin.

CRYSTAL VIOLET
SWINE FEVER VACCINE

HOECHST

For further information write to :
HOECHST PHARMACEUTICALS LIMITED, VETERINARY DIVISION, SLOUGH

Sole distributors in the United Kingdom : HORLICKS, LIMITED, SLOUGH, BUCKS.
Telephone: SLOUGH 22322 (6 lines) Telegrams: HORLICK, SLOUGH

THE VETERINARY RECORD

Founded by William Hunting, F.R.C.V.S., in 1888

Volume 73
No. 10

SATURDAY, MARCH 11th, 1961

7 Mansfield Street,
London, W.1.
Museum 6541

Costs and Fees in Private Practice

ON another page is reviewed the Economics Committee Report of the Society of Practising Veterinary Surgeons, and it may be suggested, straight away, that this is a work of major importance. In gathering data, analysing it, and drawing conclusions the Committee had the benefit of professional advice from a cost consultant, and the very first of his comments, which appears towards the end of the book, may occasion sufficient surprise. "From a strictly economic point of view," he observes, "very few practices are making a profit." He goes on to say, "judged by other professions . . . the practising veterinary surgeon is overworked . . . veterinary surgeons underestimate their value to the community."

The average professional man or woman is not familiar with the technique of accountancy; and it is surprising, when the dispassionate yardstick of financial reality is applied to the day-by-day details of practice, to see how many items either are not considered at all in the veterinarian's estimate of practice costs, or are so much underestimated as to eat into professional income to an extent that is hardly credible. It is here that this publication has its greatest value: it compels veterinary surgeons in both large- and small-animal practice to face what their real costs are; and in doing that it enables them, for the first time, to estimate on an economic basis what fees ought to be charged in order to earn a reasonable profit both on professional activities, and on the capital, real and as goodwill, which a practice represents.

Professional fees, it appears, have remained "virtually unaltered for over a decade," in spite of increases in all other directions; and ironically enough principals have, to a considerable degree, only themselves to blame. Apart from the *leit motif* of this particular book—that many veterinary surgeons in practice do not assess correctly what their real costs are—the profession as a whole has for too long displayed a curious prejudice against discussing the subject of fees frankly and realistically. There has been, as it were, a shying away from fees as something professionally undignified, something hardly in good taste. There have been rumblings about undercutting; about disproportionate charges for drugs; about standardised charges for certain procedures; but, until now, no one has done—or seemed to wish to do—anything constructive. The result of this natural but exaggerated sensitivity has been—to rob the profession.

The Report, as becomes a domestic document, is restricted to members of the profession; but it provides ample data for those who may wish to demonstrate to clients how their accounts are made up. The statistics quoted—for which the Economics Committee was indebted to many private practitioners—are not completely up to date, by reason of time taken in analysing returns, writing the text and publishing the finished work; but they provide, in a long series of clear and eminently practical tables, a more than sufficient answer to queries which even the most pedantic client might raise. They do more than this; they face, and demolish, the alleged need among a minority of veterinary surgeons for making restricted drugs pay an undue proportion of practice overheads. The Report says, unequivocally, "practising veterinary surgeons should earn their living by fees for professional skill and advice and not from retail pharmacy . . . an exorbitant profit on a drug is indefensible." The restriction of certain powerful therapeutic agents to professional men and women is for the protection of livestock against ignorant interference: it is not for the protection of the profession's financial interests.

But since the profession should thus honour the trust reposed in it, our clients must be expected to honour their obligations also. Skilled service, and professional time and equipment cost money, and there remains too much truth for comfort in the hoary old quip that, in farming accounts, veterinary services are included among "incidentals" and do not even merit separate mention. Stories are rife in any gathering of veterinary surgeons of credit for fees extending sometimes over years; and while this is a hazard common to all professions there should be a reasonable limit beyond which credit ought not to be demanded; and farmers with flocks and herds

(*Concluded at foot of page overleaf*)

Controlled Tests with Three Organic Phosphorus Compounds as Anthelmintics Against *Haemonchus contortus* in Sheep

BY

T. E. GIBSON

Central Veterinary Laboratory, Weybridge

SUMMARY.—In controlled tests carried out on sheep artificially infected with Haemonchus contortus, *Trolene given at a dose rate of* 110 *mg. per kilogram of bodyweight was* 31 *per cent. efficient; Neguvon given at a dose rate of* 100 *mg. per kilogram of bodyweight was* 100 *per cent. efficient; Ruelene given at a dose rate of* 75 *mg. per kilogram of bodyweight was* 91 *per cent. efficient. These results are discussed in the light of the findings of other workers and the value of these compounds for use in sheep assessed.*

THE results of tests of two organic phosphorus compounds as anthelmintics for the removal of *Trichostrongylus axei* from sheep have already been reported (Gibson, 1960). The present paper records the results of further tests with the same two substances, 0,0-dimethyl 0-2,4,5-trichlorophenyl phosphorothioate ("Trolene") and 0,0-dimethyl 2,2,2,-trichloro-1-hydroxymethyl phosphonate ("Neguvon") as anthelmintics for the removal of *Haemonchus contortus* from sheep as well as tests with 4-tert.-butyl-2-chlorophenyl methyl methylphosphoramidate ("Ruelene") for the same purpose.

Materials and Methods

The controlled test, Moskey and Harwood (1941), was used in the present experiments, the critical test of Hall and Foster (1918), being inappropriate since abomasal worms killed by an anthelmintic are likely to be digested in passing down the intestine, resulting in an inaccurately low estimate of anthelmintic efficiency.

The 16 lambs used in the experiment, although originally reared free from gastro-intestinal nematodes, had been used in an experiment on the epidemiology of nematodiriasis, during which all had acquired infestations of *Nematodirus* spp. These infestations had been spontaneously eliminated before the anthelmintic tests began. At the commencement of the present experiment, the lambs were 7 months old, and were each given 8,000 infective larvae of *H. contortus*. Four weeks later, by which time all the worms should have reached maturity, the animals were divided into 4 groups. The first group was treated with Trolene at the rate of 110 mg. per kilogram of bodyweight, the second with Neguvon at the rate of 100 mg. per kilogram of bodyweight, the third with Ruelene at the rate of 75 mg. per kilogram of bodyweight. The drugs were administered by

---

Costs and Fees in Private Practice.—*Concluded.*

at to-day's values should be ready not only to call in skilled advice and help, but to pay for it on a just scale; the veterinary surgeon has an ever increasing service to offer—but he has to live.

This question of the payment of fees introduces another topic upon which the Economics Committee sound a timely warning, and that is the degree of dependence of many large-animal practices upon work from the Ministry. There would appear to be not only the obvious danger here, with the completion of tuberculosis eradication, but a subtler one when it is observed that "as a result of this dependence many professional fees have remained unchanged for so long that they are now, without doubt, uneconomic and, *ipso facto* many routine items of work are carried out at less than cost." It is such anomalies as this, together with the profession's own out-dated reluctance to face the subject of fees squarely that has led to the situation so clearly illustrated by this Report—that fees generally, bearing no logical or mathematical relationship to costs, are too low. A striking comparison is made at the end of the Report between the earnings of a skilled motor mechanic and those of an assistant veterinary surgeon; but perhaps we are all too much conditioned to the post-war proposition that the prosperous artisan is an object of legitimate social satisfaction, while the comparably rewarded professional man is mere fodder for taxation!

The whole of this Report is of so much interest, and is so lucidly expressed that much more comment could be made about it. Everyone, may not agree with all its views or subscribe without reservation to all its findings; but it is an historic document; one which every veterinary surgeon in practice should possess, and a work of which its authors may be proud.

means of a drenching gun, the Trolene and Ruelene being suspended in water and the Neguvon dissolved in water for this purpose. Five days later, all the lambs were slaughtered for *post-mortem* examination, when the abomasum and small intestine were separately removed from each lamb and examined for the presence of gastro-intestinal nematodes by the usual dilution technique. Faecal egg counts were also carried out at intervals during the experiment.

Results

The faecal egg counts were carried out mainly to assess the evenness of the infections produced in the experimental animals, and as they were not used to assess anthelmintic efficiency they are not recorded in this paper. The percentage reduction in egg count of the 3 treated groups compared with the control group was however of the same order as the reduction in worm burden recorded in Table I. The results of the worm counts carried out on the experimental lambs following *post-mortem* examination are recorded in Table I and from the group totals an estimate of anthelmintic efficiency has been calculated. No evidence of toxicity was observed in any of the animals in the three groups of animals which received treatment.

TABLE I
SUMMARISING THE RESULTS OF THE EXPERIMENT

Name of drug	Dose rate employed mg. per kg.	Number of *H. contortus* present in abomasum at *post-mortem* examination	Total number of worms in group	Percentage efficiency
Trolene	110	1,550 3,100 3,000 4,300	11,950	31
Neguvon	100	0 0 0 0	0	100
Ruelene	75	0 0 0 1,500	1,500	91
Control group	—	6,050 4,350 3,450 3,550	17,400	—

Discussion

Gordon (1958) tested Trolene and found, on the criterion of reduction of faecal egg count, that 44 mg. per kilogram of bodyweight was not very effective against *H. contortus*, whereas 220 mg. per kilogram of bodyweight was very effective. Schad, Allen and Samson (1958) carried out critical tests in 3 sheep, using a dose rate of 100 mg. per kilogram of bodyweight and could demonstrate no useful anthelmintic activity. Dorney and Todd (1959), however, using doses of 200, 400 and 600 mg. per kilogram of bodyweight, claimed useful anthelmintic action against *H. contortus*, as judged on egg count data. Toxic symptoms were seen at the higher dose levels, 1 lamb of 9 treated at 600 mg. per kilogram of bodyweight dying as a result of treatment. In the present work, at a dose rate of 110 mg. per kilogram, 31 per cent. efficiency was observed. There seems to be general agreement that at dose rates of about 100 mg. per kilogram of bodyweight Trolene has no useful anthelmintic effect against *H. contortus*. For effective anthelmintic action against *H. contortus*, a dose rate of 200 mg. per kilogram of bodyweight is required, and this dose rate must not be exceeded if toxic symptoms are to be avoided.

The anthelmintic activity of Neguvon against *H. contortus* was favourably reported on by Gordon (1958). Doses of 58 mg. per kilogram of bodyweight were usually 100 per cent. effective against *H. contortus*. Toxic effects were not, however, observed until the dose rate was 3 times this level. Stampa (1959) also used Neguvon with success against *H. contortus* in a field trial, and at a dose rate of 100 mg. per kilogram of bodyweight observed no toxic effects in 400 sheep treated. At 110 mg. per kilogram of bodyweight 10 of 75 sheep treated reacted to the drug, but recovery was prompt, but at a dose of 130 mg. per kilogram of bodyweight severe toxicity was seen in 2 of 6 sheep treated. In another district, however, toxicity was observed at 90 and 100 mg. per kilogram of bodyweight. In the present work, 100 mg. per kilogram of bodyweight was completely effective and no toxic effects were observed.

Ruelene was found in the present tests to be 91 per cent. efficient. In 3 animals the drug was 100 per cent. efficient whilst in the fourth the efficiency was 65 per cent. This variability may indicate that the efficiency of the drug varies according to whether it passes to the rumen or is swallowed directly into the abomasum. Further work would be required to settle this point. The only other published work on the efficiency of Ruelene in sheep is that of Douglas and Baker (1959) who used the drug at dose rates of 100 and 200 mg. per kilogram of bodyweight and found useful anthelmintic effect against *Ostertagia* spp. and *Trichostrongylus axei* but these sheep were not carrying *H. contortus*.

Neguvon and Ruelene have useful anthelmintic activity against *H. contortus* and there is evidence from the results of other workers that Trolene is also effective when used in higher dose rates than were tested in these experiments. Further investigation of the full range of activity and of the toxicity of these compounds must be carried out before they can be recommended as substitutes for the anthelmintics at present in use for sheep.

References

DORNEY, R. S., & TODD, A. C. (1959). *J. Amer. vet. Med. Ass.* **135**. 336.
DOUGLAS, J. R., & BAKER, N. F. (1959). *Ibid.* **135**. 567.
GIBSON, T. E. (1960). *Vet. Rec.* **72**. 343.
GORDON, H. McL. (1958). *Aust. vet. J.* **34**. 104.
HALL, M. C., & FOSTER, W. D. (1918). *J. agric. Res.* **12**. 397.
MOSKEY, M. E., & HARWOOD, P. D. (1941). *Amer. J. vet. Res.* **2**. 55.
STAMPA, S. (1959). *J. S. Afr. vet. med. Ass.* **30**. 19.
SCHAD, G. A., ALLEN, R. W., & SAMSON, K. S. (1958) *Vet. Med.* **53**. 533.

A Short Note on the Heavy Mortality in Foxes During the Winter 1959—60

BY

J. C. TAYLOR

Nature Conservancy

AND

D. K. BLACKMORE

Department of Pathology, Royal Veterinary College, London

SUMMARY.—Large numbers of wild foxes died in Great Britain between November, 1959 and April, 1960. No infectious agent has been proved conclusively to be causing these deaths.

Symptoms exhibited by dying foxes are mainly nervous in nature and lesions post-mortem *are inconsistent; haemorrhages in the lungs are often noted.*

Most deaths have occurred in arable areas, and the possibility that chlorinated hydrocarbons used in seed dressings may be indirectly poisoning foxes is discussed.

It is hoped to publish a detailed account at a later date.

Introduction

IT is known that a large number of foxes died in this country during the months of January and February, 1960. Several laboratories have been investigating the relevant problems and some findings have been published (Hodgman & Bowden, 1960; Bowden, Hodgman & Hart, 1960).

It is not unusual for foxes to die of disease, and there are records of catastrophies—one took place in the years 1895-97 when "mange" killed a large number (Lascelles, 1915). The present episode differs in that the cause of death was not often apparent, although many carcases examined were of foxes which had died from causes which included streptococcal septicaemia, hydrocephalus and gunshot wounds.

Distribution

The first cases in the present series occurred in an area near Oundle in Northamptonshire, early in November, 1959, although odd cases of uncertain aetiology had been observed during preceding months, especially during March of that year. In succeeding months deaths became more common and widespread, affecting especially the counties of Northamptonshire, Lincolnshire, Huntingdonshire, Cambridgeshire, Hertfordshire, Essex, Suffolk and Rutland; odd cases occurred in surrounding counties and a few even farther away. The severely affected area is shown on the accompanying map and was the situation up to April, 1960; since that date few similar cases have apparently occurred. An estimation of the numbers involved has been derived from the experience of Masters of Fox-Hounds, who were most co-operative; approximately 1,300 foxes have been found dead, throughout the country. Although little is known of the original fox population, there is evidence that in many of the areas concerned a very severe decrease in numbers is represented.

FIG. 1.—Area of highest fox mortality.

Symptoms and *Post-mortem* Findings

One of the most striking symptoms of the sick foxes was the apparent loss of their fear of mankind; they were found wandering in broad daylight in public places, and in unlikely localities such as the Heythrop Master's yard. The course of the illness, as pieced together from the observed cases, appeared to be very brief, lasting only a matter of hours during which time the animals became hypersensitive to noise, resulting in convulsions with intervening periods of coma and apparent blindness.

Some carcases were found with grass or turf in the mouth, and others near water.

Post-mortem examination revealed bodyweights to be slightly below average, and little food material in the alimentary tract, suggestive of inappetence before death.

Few constant lesions were noted except for haemorrhages, especially in the lungs, and degenerative changes in liver and kidneys.

Discussion

There appeared to be no spread of the disease from Oundle, as might have been expected had the disease been an infectious one, and there was little or no correlation between the distance from this "centre" and other outbreaks.

The areas in which foxes have been dying are mainly arable, and in the same areas there have been deaths of unknown aetiology in grain-eating birds, particularly pigeons and in predators and carrion eaters, such as farm cats and crows. These observations and the similarity between the symptoms of the species concerned and those described in papers (DeWitt, 1955) on poisoning caused by chlorinated hydrocarbons, led to enquiries into the use of agricultural poisons.

One of the original suggestions made as to the cause of death during the early days was of foxes being poisoned secondarily through eating birds which had died after feeding on grain dressed with the chemical, dieldrin, which is used to protect seedlings against bulb-fly and wireworm.

In succeeding months, some research work was focused on the possibility of a virus being involved and fox encephalitis figured high among suspected causes.

In conjunction with the Ministry of Agriculture, estimations are now being made as to the dieldrin residues in fox carcases, and live foxes are being fed with dieldrin. Owing to technical difficulties involved in analysis, too few results have yet been obtained to make any comments; although the results are encouraging.

The evidence that chlorinated hydrocarbon poisoning of foxes occurs, is based on the distribution of the deaths, the symptoms and *post-mortem* findings; these are not very specific and neither are they in poisoning due to dieldrin.

No accurate data are available as to the distribution on the use of dieldrin in this country, but it is known that bulb-fly and wireworm are most abundant in the eastern part of England, and from the Land Utilisation map of 1944 it is apparent that the denser zones of arable country coincide with the major areas of the "fox death." The "dieldrin theory" is supported by the fact that the deaths occurred during a limited period, November to April, and that this period coincides with the drilling of winter and spring corn. In some areas there were two distinct waves of foxes dying, corresponding to these sowing periods.

Early objection to the theory lay in the fact that dieldrin had been used as a seed dressing in years previous to the last season without such a serious effect on the wild life. Work in Sweden (Borg, 1958) suggested that the sequence of events is dependent on the availability of the poisoned grain; this is largely controlled by the weather conditions. During a normal winter, grain soon sprouts and is no longer attractive to seed-eating birds, while in a dry winter, such as last winter, treated grain remains unchanged over long periods.

If the theory is substantiated the possibility of last year's high mortality among foxes depends largely on the prevailing weather conditions, with an assumption that the agricultural practice of using dieldrin remains unchanged.

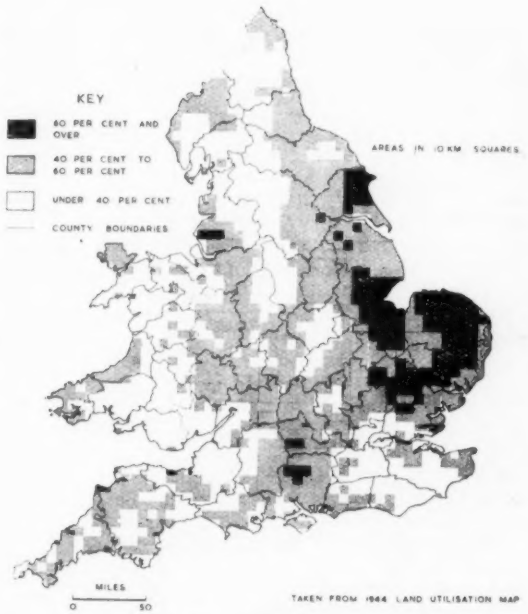


FIG. 2.—Arable areas of England and Wales.

If a similar condition prevails next season there would be fewer dead foxes found because of a reduced population but the overall effect is likely to be more serious. In the wake of this episode there are likely to be many interesting developments relating to prey species, especially in the light of there being evidence that other predators have been severely affected in the same areas.

References

BORG, K. (1958). *Proc. 8th Nordic Veterinary Congress.* 394.

BOWDEN, R. S. T., HODGMAN, S. F. L., HART, C. F. (1960). *J. Small Animal Practice.* **1.** 94.

DAHLEN, J. H., & HAUGEN, A. O. (1954). *J. Wild life Mgmt.* **18.** 477.

DEWITT, J. B. (1955). *J. Agric. Food. Chem.* **3.** 672.

HODGMAN, S. F. L., & BOWDEN, R. S. T. (1960). *Vet. Rec.* **72.** 54.

———, & ———. (1960). *Ibid.* **72.** 168.

LASCELLES, G. (1915). "Thirty-five years in the New Forest." 220. Arnolds, 1915.

The Anthelmintic Efficiency of Bephenium Hydroxynaphthoate Against the Pre-patent Stages of Gastro-intestinal Strongyles in Nigerian Zebu Cattle

BY

J. ARMOUR,* J. A. HART, R. P. LEE† and J. G. ROSS

Federal Department of Veterinary Research, Vom, Nigeria

SUMMARY.—Using artificial infections, a specific trial to test the larvicidal properties of bephenium hydroxynaphthoate against the gastro-intestinal strongyles of cattle was carried out. At a dosage rate of 225 mg. per kg. bodyweight the anthelmintic proved very effective against the 5th larval stages of Haemonchus *spp. and* Oesophagostomum radiatum *and the 4th and 5th larval stages of* Cooperia *spp. Some anthelmintic action was recorded against the 5th larval stage of* Trichostrongylus axei *and the 4th larval stage of* O. radiatum. *The 4th larval phases of* Haemonchus *spp. and* T. axei *were not effectively removed. The application of these results to the control of helminthiasis in Nigeria by anthelmintic medication is discussed.*

Introduction

IN the past anthelmintic trials have been designed, primarily, to estimate the activity of a drug against the adult or egg-laying stages of the parasite. As a result, knowledge of the larvicidal properties has often been limited to observations made during critical tests.

Recent work in the field of parasitic immunity has shown the importance of larval or pre-patent stages in helminth diseases. For example, Martin, Thomas and Urquhart (1957), described an outbreak of atypical ostertagiasis in housed cattle, which they attributed to the presence of large numbers of retarded or inhibited stages. Again, Soulsby (1960) quoting Roberts, reported instances where larvae of *Haemonchus placei* were retarded in their development due to the presence of adult worms. Removal of the adult *H. placei* by anthelmintics promoted the maturation of the retarded larvae to produce, in some cases, a fatal infection. Soulsby (1960) also recognised that, with the recent advent of parasitic vaccines, the incidence of retarded larval populations capable of producing disease, may well become more frequent.

It is obvious, therefore, that specific larvicidal trials are an essential adjunct to the field trials and critical tests normally employed in anthelmintic testing.

Rawes and Scarnell (1959) reported that bephenium hydroxynaphthoate effectively removed larval and adult stages of *Nematodirus* spp. and immature and adult *Haemonchus contortus* and *Ostertagia* spp. in sheep. In Nigeria, Armour and Hart (1960) carried out field trials and critical tests with bephenium hydroxynaphthoate and found it non-toxic, yet effective against adult *Haemonchus* spp., *Cooperia* spp., *Trichostrongylus* spp., *Oesophagostomum radiatum* and *Bunostomum phlebotomum* in cattle. The present paper reports the results of a further trial to estimate the efficiency of bephenium hydroxynaphthoate against the pre-patent stages of these strongyles.

Materials and Methods

The bephenium hydroxynaphthoate was prepared and administered in the same manner as described by Armour and Hart (1960).

Sixteen parasite-free White Fulani Zebu calves, aged 4 to 8 months and weighing between 86 and 156 kg. were infected artificially each with 18,530 mixed infective larvae. The larvae were given orally in one dose composed of 2,190 *Haemonchus* spp., 5,170 *Cooperia* spp., 1,810 *Trichostrongylus axei*, 7,470 *O. radiatum* and 1,890 *B. phlebotomum*. The 16 calves were divided into 4 equal groups. One group acted as controls while the other 3 groups, 1, 2 and 3, were dosed with bephenium hydroxynaphthoate at 7, 14 and 28 days, respectively, following artificial infection. A dosage rate of 225 mg. per kg. bodyweight was employed throughout. The calves were housed in groups in concrete pens which were cleaned out daily. Access to these pens was *via* a footbath filled with disinfectant.

Faecal egg counts and differential cultures, using the methods of Roberts and O'Sullivan (1950) and Keith (1953), were made at weekly intervals up to the 77th day after infection. Two calves from each group were then slaughtered and differential worm counts made using the standard dilution techniques.

The method of Riek and Keith (1958) for evaluating the efficiency of organic phosphorus compounds against the immature stages of gastro-intestinal strongyles in cattle was adopted.

This method consisted of following the course of faecal egg counts in treated and non-treated artificial infections and was modified by slaughtering half of the calves in each group as a check on the results obtained by faecal examinations.

Preliminary data obtained at Vom with artificial infections of *Haemonchus* spp. in parasite-free calves indicated that low infective doses resulted in mature infections within the normal pre-patent period. Previously Martin *et al.* (1957) working with *Graphidium strigosum* in parasite-free rabbits observed the same phenomenon and also recorded that when large infective doses were given some retardation of

* Now at the Cooper Technical Bureau, Berkhamsted, Herts.

† Present address: Department of Parasitology, Faculty of Veterinary Science, University College, Dublin.

development occurred. The size of the different infective doses in the present experiment was therefore kept low to permit normal maturation of established infections.

Results

The maximum faecal egg counts during the trial of the different species in individual calves and their group means are shown in Table I. The mean differential worm counts for the animals slaughtered in each group are given in Table II. There is close agreement between the results of the differential faecal egg counts and the differential worm counts. A table of pre-patent periods (Table III) has been included as a check on the origin of eggs seen in the faeces of individuals, *i.e.* whether they originated from the experimental or from accidental cross infection.

The results do not include those of *B. phlebotomum* as the infections established with this parasite were too low to permit any significant conclusions being drawn.

TABLE I
MAXIMUM FAECAL EGG COUNT (IN EGGS PER GRAMME OF FAECES) AFTER TREATMENT WITH BEPHENIUM HYDROXYNAPHTHOATE

Species	Interval between infection and treatment									
	Untreated control group					7 Days (Group 1)				
	Animal numbers				Group	Animal numbers				Group
	3696	3697	3727	3723	Mean	3716	3719	3724	3732	Mean
Haemonchus spp.	1,945	1,806	2,113	3,309	2,293	809	1,416	2,251	2,264	1,685
Cooperia spp.	1,533	635	591	1,103	966	34	10	10	14	17
Trichostrongylus axei ...	112	148	139	184	146	80	62	119	83	86
Oesophagostomum radiatum	902	813	1,575	2,145	1,359	372	414	417	190	348

Species	Interval between infection and treatment									
	14 Days (Group 2)					28 Days (Group 3)				
	Animal numbers				Group	Animal numbers				Group
	3688	3710	3713	3714	Mean	3693	3698	3723	3730	Mean
Haemonchus spp.	655	116	632	34	359	66	11	—	—	19
Cooperia spp.	28	3	7	—	10	46	10	8	20	21
Trichostrongylus axei ...	53	30	43	27	38	20	4	18	—	11
Oesophagostomum radiatum	616	58	263	610	387	16	5	330	—	88

TABLE II
MEAN DIFFERENTIAL *Post-mortem* WORM COUNTS

Species	Untreated control group	Group 1	Group 2	Group 3
Haemonchus spp.	770	245	40	5
Cooperia spp. ...	1,475	50	—	50
Trichostrongylus axei	200	300	150	50
Oesophagostomum radiatum ...	2,245	575	1,335	120

The *Haemonchus* spp. found at *post-mortem* examination were *H. contortus* and *H. placei*. The number of adult *Haemonchus* spp. worms found in the controls slaughtered (Table II) was 35 per cent. of the infective *Haemonchus* spp. larvae given. No larval stages were recovered at *post-mortem* examination. Tables I and II show that bephenium hydroxynaphthoate had little action on 7-day *Haemonchus* spp. and was only partially effective in 2 out of 4 animals treated at 14 days. In the remaining 2 animals treated at 14 days and all 4 treated at 28 days the drug was highly effective.

The adult *Cooperia* spp. present at *post-mortem* examination were *Cooperia punctata* and *Cooperia pectinata*. No larval stages were found. The percentage take of *Cooperia* spp. infective larvae, judged by worm burdens in the slaughtered controls was 35 per cent. Tables I and II illustrate that bephenium hydroxynaphthoate is effective against 7, 14 and 28-day *Cooperia* spp.

The number of *T. axei* adults found in the slaughtered controls represented 11 per cent. of the *T. axei* infective larvae given. No larval stages were found at *post-mortem* examination. Tables I and II indicate that bephenium hydroxynaphthoate is ineffective against 7-day, slightly effective against 14-day and effective in removing 28-day *T. axei*. The anthelmintic action is therefore similar to that against *Haemonchus* spp. though there is less effect on the 14-day parasite.

The mean number of adult *O. radiatum* worms found in the controls at *post-mortem* examination was 2,245 (Table II) which is 30 per cent. of the *O. radiatum* infective larvae given. A few 5th-stage larvae were also found in one of the controls (No. 3723) at *post-mortem* examination. Tables I and II show that bephenium hydroxynaphthoate was very effective against 28-day *O. radiatum* but showed a variation in action against 7-day and 14-day *O. radiatum*.

Discussion

The pre-patent periods of the strongyle species involved in the present trial have previously been

reported as 21 days for *H. contortus* in sheep (Veglia, 1915), 28 days for *H. placei* in cattle (Bremner, 1956), 11 to 16 days for *C. punctata* in calves (Bailey, 1949), 21 days for *T. axei* in sheep and cattle (Lapage, 1956) and 37 to 41 days for *O. radiatum* in calves (Andrews & Maldonado, 1941). Considering that faecal examinations were made at weekly intervals the majority of pre-patent periods shown in Table III agree with those recorded elsewhere and confirm that the infections established resulted from the artificial administration of infective larvae.

The pre-patent intervals for *T. axei* were consistently slightly longer than that stated by Lapage (1956). A reason for this delay is found in the work of Gordon (1948) who pointed out that *T. axei* females were low egg producers and slow to reach full production.

Some other figures recorded in Table III require an explanation. Four calves with low *Cooperia* spp. faecal egg counts (Nos. 3710, 3713, 3724, 3732), 3 calves with low *T. axei* faecal egg counts (Nos. 3693, 3698, 3723) and 1 animal with a low *O. radiatum* faecal egg count (No. 3698) showed extended pre-patent periods for these species. This may have resulted from accidental cross-infection or the low nature of the infections may have prevented their earlier detection at faecal examination. The relevant species faecal egg counts of these animals were too low (under 28 e.p.g.), however, to affect the interpretation of drug action. Another calf, No. 3723, showed a maximum *O. radiatum* faecal egg count of 330 e.p.g. and had a prolonged pre-patent period for this species. While extraneous infection may have occurred in this case a more likely explanation is that some larval stages were still in the bowel wall at the time of treatment and resumed their development after the drug was no longer present. This is substantiated by the fact previously recorded that 5th-stage larvae of *O. radiatum* were found in No. 3723 at *post-mortem* examination.

TABLE III
NUMBER OF DAYS BETWEEN ARTIFICIAL INFECTION AND FIRST APPEARANCE OF EGGS IN THE FAECES

Species	Untreated control group				Group 1				Group 2				Group 3			
	Animal numbers				Animal numbers				Animal numbers				Animal numbers			
	3696	3697	3727	3733	3716	3719	3724	3732	3688	3710	3713	3714	3693	3698	3723	3730
Haemonchus spp. ...	28	28	28	28	28	35	28	28	28	35	28	35	35	35	28	28
Cooperia spp. ...	21	21	14	21	21	21	63	70	42	70	70	—	21	21	21	14
Trichostrongylus axei	28	35	42	28	42	42	28	42	42	35	42	42	63	70	56	28
Oesophagostomum radiatum	49	49	49	42	49	49	56	49	49	49	56	49	56	63	70	—

The life cycles of both *H. contortus* (Veglia, 1915) and *H. placei* (Bremner, 1956) indicate that the fourth and final larval moult takes place shortly before 14 days in the majority of cases. The present results show, therefore, that bephenium hydroxynaphthoate is effective against early and late 5th-stage or immature adult *Haemonchus* spp. in cattle but ineffective against the 4th larval stages.

The life-cycle of *C. punctata* described by Bailey (1949) shows that the third larval moult takes place before 7 days and the fourth larval moult between 7 and 14 days. The results of the present trial therefore indicate that bephenium hydroxynaphthoate is effective against 4th- and 5th-stage larvae as well as adult *Cooperia* worms. It is interesting to record that the only 4th larval phases efficiently removed were those of *Cooperia* spp., which may penetrate into the bowel wall (Seddon, 1950) but normally remain in the lumen or on the intestinal mucosal surface (Bailey, 1949). This is in contrast to the other 3 genera discussed, all of which have a histotrophic 4th larval stage.

The life-cycle of *T. axei* is similar to that of *Haemonchus* spp. (Lapage, 1956). Thus the present results indicate that bephenium hydroxynaphthoate is only slightly effective against the early 5th-stage larvae but is effective against the late 5th or immature adult stage. It is ineffective against the 4th larval phase.

According to Andrews and Maldonado (1941) 7-, 14- and 28-day *O. radiatum* would be in the early 4th, late 4th and late 5th larval stages, respectively, the 7-day stage in the bowel wall and the 14- and 28-day stages in the lumen. The results therefore suggest that bephenium hydroxynaphthoate is effective against the 5th-stage larvae but variable in action against the 4th larval phase.

Lee, Armour and Ross (1960) have shown that strongyle burdens in Nigerian Zebu cattle are acquired in the wet season and are carried over the dry season in the host. Armour and Hart (1960) described how bephenium hydroxynaphthoate at 225 mg. per kg. bodyweight removed the adult or egg-laying stages of the important gastro-intestinal strongyles found in Nigerian Zebu cattle and pointed out how a single treatment of all ruminants with this anthelmintic in the dry season, would greatly reduce the numbers of infective strongyle larvae on the pastures during the next wet season. However, Hart (1960, unpublished data) studying the dry season strongyle burdens of cattle at Vom noted that many larval stages were present in addition to the adult worms. The present work has shown that while bephenium hydroxynaphthoate, given at the accepted therapeutic level, would remove adults and immatures or 5th-stage larvae of most gastro-intestinal strongles, it would not remove the majority of 4th-stage larvae. As pointed out previously inhibited larval stages can develop to maturity following anthelmintic therapy, therefore a second treatment with bephenium hydroxynaphthoate 2 weeks after the initial dose would

(*Concluded at foot of col. 1 opposite*)

Anaesthesia and Surgery in Cage and Aviary Birds—IV

BY

L. ARNALL

University of Liverpool, Veterinary Hospital

A Systemic Outline of Surgical Conditions (continued).

The Reproductive System

(See Arnall, 1958 ; Jennings, 1959 ; Feyerabend, 1951 & 1957 ; Friedberger & Froehner, 1910 ; Gray, 1936 ; Hare, 1937 ; Jones, 1956 ; Ratcliffe, 1933 ; Watmough, 1955 ; Taylor, 1958.)

THIS section is divided as follows :—

Male : The testes—tumours, true and false sex reversal.

Female : The ovaries and oviducts—tumours, salpingitis, cramp or spasm of the oviduct, ruptured oviduct, sacculation and cystic dilatation of the oviduct, retained egg, abnormal egg, extra-tubal egg material, prolapse.

Male

The testes are among the commonest sites of neoplastic change. Birds which die from other causes are frequently found to have enlarged gonads showing early neoplastic changes. Symptoms are rarely shown until the organ has attained a size of 1 cm. diameter in small passerine and psittacine birds and a much greater size in the larger species. The most common clinical signs are increased respiratory rate and depth due to pressure, together with loss of voice, some lethargy, browning of the blue cere in budgerigars and later abdominal enlargement. Masses of 2·5 cm. diameter may cause only mild dyspnoea. Certain types of neoplasm cause some loss of male assertiveness but rarely bring about an increase. Histological types include the seminoma and the sertoli-cell tumour. Macroscopically they usually appear smooth and spheroidal, although sometimes lobate. Their colour lies in the yellow-grey-pink range. On superficial examination at laparotomy (which is well worth attempting in a strong bird) confusion may arise between splenic and renal and gonadial tumours, and a careful search for the site of origin is necessary. It is possible to remove such growths surgically provided adequate haemostasis is effected before excision. Metastases from these tumours are rare but are occasionally found in the spleen, lungs and liver. Metastases in the testicles from primary growths elsewhere are usually accompanied by others in more vital organs which are more easily detected.

True sex reversal is probably almost as rare in birds as it is in man and other mammals, but a large number of birds which look and behave like males (singing, mating, etc.) suddenly in their second or later season assume the female mien and lay eggs. The cause must relate to a changed endocrine balance, but only rarely is it possible to connect an apparent reversal with a gonadial neoplasm, and even less frequently with dual reproductive organs.

Female

The ovary is almost as prone as the testicles to neoplastic changes, and tumours containing cell types of ovarian tissue are met, most of them being classifiable under the general title of carcinoma. The clinical signs and surgical treatment are similar to those described for testicular neoplasms, but as depression and abdominal enlargement naturally follow a period of egg laying, the onset of more severe symptoms often leads the owner to suspect "egg-binding." Such tumours are not usually associated with apparent sex reversal.

Inactivity, improper feeding, a cold, damp, sunless climate, and the unnatural winter breeding which is often practised may cause irregularities in the ovulation cycles. These irregularities may be aggravated by too frequent interference by persons in contact with the bird and by the very variable room temperature in which it is kept. Catarrhal salpingitis, loss of tone, cramp or spasm of the smooth muscle of the oviduct

---

The Anthelmintic Efficiency of Bephenium Hydroxynaphthoate.—*Concluded.*

ensure removal of those larval stages which had resumed their development.

Acknowledgments.—The authors are indebted to the Wellcome Foundation Ltd. for providing the bephenium hydroxynaphthoate and to Mr. J. T. R. Evans of the same organisation for helpful criticism. Acknowledgments are also due to Messrs. Ekejiuba, Okeke and Onwualu for technical assistance and to the Director of Veterinary Research for permission to publish this paper.

References

ANDREWS, J. S., & MALDONADO, J. F. (1941). *Res. Bull.* No. 2. Puerto Rico Agric. Exp. Station.

ARMOUR, J., & HART, J. A. (1960). *Vet. Rec.* **72.** 306.

BAILEY, W. S. (1949). *Amer. J. vet. Res.* **10.** 119.

BREMNER, K. C. (1956). *Aust. J. Zool.* **4.** 146.

GORDON, H. McL. (1948). *Aust. Vet. J.* **24.** 17.

KEITH, R. K. (1953). *Aust. J. Zool.* **1.** 223.

LAPAGE, G. (1956). "Monnigs Veterinary Helminthology and Entomology." 4th Edition. Baillière, Tindall & Cox, London.

——. (1956). "Veterinary Parasitology." Oliver & Boyd.

LEE, R. P., ARMOUR, J., & ROSS, J. G. (1960). *Brit. Vet. J.* **116.** 34.

MARTIN, W. B., THOMAS, B. A. C., & URQUHART, G. M. (1957). *Vet. Rec.* **69.** 736.

RAWES, D. A., & SCARNELL, J. (1959). *Ibid.* **71.** 645.

RIEK, R. F., & KEITH, R. K. (1958). *Aust. Vet. J.* **34.** 93.

ROBERTS, F. H. S., & O'SULLIVAN, P. J. (1950). *Aust. J. Agric. Res.* **1.** 99.

SEDDON, H. R. (1950). "Diseases of Domestic Animals in Australia." Commonwealth of Australia, Dept. of Health, Service Publications (Division of Veterinary Hygiene). No. 5, Part I, "Helminth Infestations."

SOULSBY, E. J. L. (1960). *Vet. Rec.* **72.** 322.

VEGLIA, F. (1915). 3rd and 4th Reports of the Director of Veterinary Research, Union of South Africa, p. 432.

are common in canaries, budgerigars, pigeons and parrots, particularly in cold, wet weather. These processes cause stasis or the retrograde passage of unshelled and double-shelled eggs, and pea-like nodules of inspissated albumen or effusions of albumen. The commonest clinical picture is the retained egg. In this condition the bird, often exhausted, is presented with a congested, bulging cloacal region. It holds the wings away from the flanks, the feathers are ruffled and other signs of straining are seen. The owner has probably already smeared the cloaca with olive oil and this has caused matting of much of the plumage.

The best treatment is the application of dry heat for some hours (ultra-violet and infra-red lamps have also been used). This serves to provide relaxation of the spasm and induce normal tone to the oviduct. The completely formed egg is probably never the cause of egg-binding for the cramp commences before the shell is laid down. Oily application will rarely succeed where heat fails. Fanciers claim success with gin, diluted 1 : 40 in water and given by the mouth but its efficacy is very doubtful. Untreated birds are prone to pneumonia and will die.

(For differential diagnosis see Abdominal Swellings)

Rupture of the oviduct and the presence of extra-tubal material are usually sequelae to the foregoing conditions and are the result of longstanding stasis and irritation of the tubal epithelium. Ulceration and perforation occur in the distal part of the duct. At other times egg material or even entire eggs are returned to the abdominal cavity by anti-peristalsis. The resultant shock and peritonitis cause the bird rapidly to become ill and it usually dies in from 1 to 3 days. An ailing bird with a soft distended abdomen is the usual picture. The cause is usually discovered at exploratory laparotomy. Only those birds with an intact egg and a slight peritonitis have a reasonable chance of recovery after the cause is removed.

Sacculation and cystic dilatation of the oviduct. The aetiology of sacculation and cystic dilatation of the oviduct is not fully known, but spasm or stricture of the terminal portion may be a contributory factor. The contents of the swelling, which in budgerigars may exceed 1·5 cm. in diameter, may be clear and watery, milky or mucoid and contain white or cream granules which probably represent inspissated albumen or yolk. Usually the abdomen also contains ascitic fluid or serous exudate. (For surgical treatment see the appropriate section.)

Prolapse of the oviduct is occasionally met in most species but is fairly common in canaries, pigeons, parrots and budgerigars. It results from lack of tone in the oviduct and is usually found in a recently laying bird. Predisposing causes are those previously mentioned. Preferably using inhalation or local anaesthesia, the organ can be replaced by applying pressure with a lubricated glass rod, spatula, or finger. In recurring cases a pursestring suture in the cloacal rim may be required for a few hours while a glass rod is maintained in the oviduct. Such sutures must always be removed within 24 hours. Adrenalin packs and antihistamine or cortisone creams may help to reduce swelling and congestion in difficult or long-standing cases.

The Urinary System

(See Sturkie, 1954.) This section deals with renal neoplasia (Feyerabend, 1957 ; Ratcliffe, 1933) and gout (Jennings, 1959 ; Gray, 1936).

Tumours of the kidney are uncommon but they do occur occasionally and give rise to impaired urate excretion. Schlumberger, quoted by Feyerabend (1957) finds renal carcinoma fairly common. The first clinical sign is usually a firm abdominal distention and it is likely that the more common gonadial neoplasia will be suspected. The kidney is too deeply situated in its irregular bony chamber for attempts at surgical removal to be successful.

Visceral and articular gout are less common in most species than in poultry, although Gray (1936) states that gout is relatively common in canaries, budgerigars and parrots. Heredity, avitaminoses and inactivity are probably contributory factors. In its articular form the main surgical interests lie in the similarity of gout to pustule formation and to bacterial arthritis where both causes can produce a creamy pus-like material and a progressive crippling effect. The visceral form is at times suggestive of aspergillosis. Better response is obtained by a change to a laxative diet containing fruit and green food, a greater fluid intake, and a more active life, than by surgical interference.

Special Organs

(See Crewe & Mirskaia, 1931 ; Feyerabend, 1957 ; Hare, 1937 ; Riddle, Nussmann & Benedict, 1932 ; Schlumberger, 1955 ; Sellwood, Massey & Waterhouse, 1960 ; Sturkie, 1954.)

The Thyroid Gland. In birds this is situated ventrally in the neck at the entrance to the thorax. Part of it lies between the two clavicles, astride the trachea and immediately anterior to the syrinx. It is a not uncommon site of pathological change, but overlain as it is for the most part by the crop, coupled with its close proximity to the carotid and jugular vessels and the clavicular airsacs, it is a difficult area for exploratory surgery. Cases of hyper- and hypothyroidism are sometimes met, while neoplasia, which is fairly common, frequently causes haemorrhagic swelling in the region. Benign cystic adenoma and colloid goitre have been reported in the pigeon (Hare, 1937) and in this connection Sellwood, Massey and Waterhouse (1960) have shown that certain millets are low in tyrosine. In colloid goitre the bird may be sluggish, weak and unable to fly. Extirpation of a unilateral or the bulk of a bilateral lesion may be possible provided anaesthesia is adequate and great attention is paid to haemostasis. An iodine-containing mineral supplement should be given with the food.

In certain strains of canary, the feather cyst syndrome is associated with the moult which is itself controlled by variations in the activity of the thyroid gland (Crew & Mirskaia, 1931 ; Sturkie, 1954). Although no histological abnormality of the gland has been so far reported in feather cyst and French moult subjects this may merely reflect an insufficient knowledge of the normal thyroid structure.

The spleen. (Arnall, 1958 ; Feyerabend, 1957 ; Gray, 1936 ; Hare, 1937.) This organ is the site of

numerous lesions—infective, degenerative and neoplastic. Frequently at laparotomy or necropsy the organ is seen to be enlarged, discoloured or studded with pale specks, and quite often the condition is unassociated with the symptoms which necessitated the investigation. Primary neoplasia of the organ cannot with certainty be identified as such at laparotomy, and extirpation of the spleen should only be attempted when the lesion is discrete and large enough to cause pressure symptoms. Rupture of a grossly engorged spleen is reported by Hare (1937) in racing pigeons as a cause of sudden death.

The pituitary body. (Feyerabend, 1957 ; Schlumberger, 1955.) Isolated cases of neoplasia have been encountered but as yet experience is insufficient to give a detailed clinical picture of disease in this structure. Schlumberger, however, quoted by Feyerabend (1957), mentions 144 pituitary neoplasms (mainly adenomata) in a survey in which pituitary tumours were commoner than fibrosarcoma in all parts of the body. The association of the adiposity syndrome of the budgerigar with pituitary lesions is as yet unexplored.

Regional Differential Diagnoses and Techniques of Some Major Operative Procedures

Ventral Cervical Swellings

Under this heading are included fluid and impacted distentions of the crop ; malignant neoplasia of the crop wall ; fatty and connective tissue tumours extending from the pectoral region ; granulomata, emphysema, and distentions of the clavicular airsac ; haematomata and thyroid neoplasia.

It is usually a simple matter to decide upon the nature of the contents of the swelling, whether it be gas, fluid, seed, fatty or neoplastic tissue, or hard caseous airsac contents. Mobility of a firm swelling usually rules out thyroid neoplasia and haemorrhage. A more difficult lesion to diagnose is the diffuse, semi-soft mass involving a large area in which the seed grains of the crop cannot be positively identified. Another difficult lesion is met when the crop can be identified and is found to be well back over the breast and surrounded by thick subcutaneous tissue. If it is known, the duration of the swelling can be helpful in diagnosis.

Surgical procedure. An exploratory puncture may be used as a diagnostic aid and may yield mucus, air or haemorrhagic fluid. As to the last of these, when it arises from a necrotic tumour it is pink, orange or greyish in colour and, in the case of lipomata, may contain yellowish grains ; fluid from a haematoma, on the other hand, is generally red to black in colour, limpid and may contain dark red fragments of blood clot.

A small exploratory incision after plucking the area can now be made under inhalation anaesthesia. The incision should be made preferably away from the crop and gently enlarged by forceps. If the lesion proves to be neoplastic it may be possible to remove it slowly in its entirety or piecemeal by blunt dissection alone. Great care, however, must be taken not to tear the crop in the process. In the case of a friable haemorrhagic mass being discovered, extra care is required and the prognosis is grave. In the absence of obvious injury, the lesion is likely to comprise haemorrhage from a major vessel which has been eroded by a neoplasm ; or may be due to cardiovascular degeneration (adiposity syndrome) or to a neoplasm of the thyroid gland. Prognosis will usually be worsened by any attempt at further investigation or extirpation.

(Surgery of the crop is dealt with in the appropriate section.)

Pectoral Swellings

Happily the great majority of such lesions are accumulations of adipose tissue of which the larger have undergone necrotic, myxomatous and more rarely sarcomatous changes of low malignancy. The more slowly growing and pendulous lesions often undergo ulceration, callus or superimposed granulation formation. In exceptional cases the fatty tissue may embrace a posteriorly placed crop or cover diffusely the ventral aspect from the posterior cervical to the cloacal region making both diagnosis and surgical intervention difficult.

Surgical procedure. Because of the narrow range of lesions at this site and their usually benign nature, the technique can be standardised. The bird is first anaesthetised to medium depth. The area is plucked and the bird is placed on its back, the wings and feet being restricted by fixing them to a small board with adhesive tape. The plucked area is cleaned, painted with an antiseptic solution and covered by a cloth in which a central hole has been arranged so as to expose the lesion. Initial incisions over the swellings should be small and the fragile skin should then be torn to make a longitudinal wound. The tips of curved closed scissors, artery forceps or spatulae are used to separate the skin from the underlying tissue. The mass is slowly elevated by burrowing these instruments under the edges of the lesion. If the friable mass is separated carefully, haemorrhage is negligible. Skin haemorrhage, which is seldom severe, can be arrested by the ultra-lightweight artery forceps or clamps used for human ophthalmic surgery. There is rarely a major adventitious blood supply. Fatty masses extending over the entire pectoral region from axilla to axilla, and from neck to mid-abdomen can be entirely removed with little shock to the bird or risk of subsequent skin sloughing. Because of general obesity it is not always possible to reach the limit of the mass and in these cases, tearing the fat between two pairs of artery forceps is the best method of separating the bulk of the lesion. Where the skin has ulcerated or contains granulation tissue the affected area can be cut away after suturing the skin with mattress gut sutures placed well away from the infected edges of the wound. Healing is rapid and complete in about a week.

Surgical treatment is futile unless dietary changes

are immediately introduced for otherwise fatty deposits of a size as great as the original lesion may recur in a period as short as 4 weeks. The changes recommended in the grain-eating birds are : reduction of human cereal foods and starchy seeds, fortification of the diet with high protein and moderately high oil-content seeds, hard-boiled egg and raw or cooked minced meat, insects or ant cocoons, and a comprehensive vitamin and mineral supplement containing iodine. Three small feeds should be given daily so that the food dish is empty most of the time. Increased exercise is seldom possible and probably of little help. The addition of thyroid extract at the rate of 0·4 mg. daily for a bird of about 100 g. weight is recommended. When mixed with food 4 to 5 times this dose can be given because of wastage during feeding, but if de-husked seed is fed wastage is much reduced and the smaller dosage rate is adequate.

Other Growths

Feather cysts are dealt with elsewhere and as diagnosis in the canary presents little difficulty they are excluded from this section. Of the remaining "growths," lipomata, granulomata and sarcomata figure frequently ; carcinomata are not common and the special sites at which they occur have been discussed elsewhere.

Diagnosis and differential diagnosis is often difficult and even with the help of biopsy examination a positive identification is not always possible. The site of the lesion will give some indication of its probable structure and, moreover, is probably a better indication of malignancy than is macroscopical examination of the substance of the lesion. The great majority exist in the complete absence of systemic disturbance or even of local inconvenience. Some irritation occurs, however, due to ischaemia, when growths develop in regions where the skin is normally taut and here pecking is sometimes seen leading to haemorrhage and infection.

Examination consists of palpation to determine the density and mobility of the mass and the probable tissue of origin. An exploratory puncture will confirm whether or not the centre is fluid. The advisability of surgery should then be considered.

Surgical procedure. Anaesthesia should be employed in most cases. If it has a well demarcated neck, the growth may be removed (*a*) by two ligatures, the proximal one to arrest haemorrhage and the distal one as a cutting and crushing agent, and (*b*) by forcipressure and excision. If the neck of the growth is poorly differentiated, a twisted silk ligature with a non-slip double throw can be applied and progressively tightened to arrest haemorrhage. In the absence of any neck or clear demarcation from surrounding tissues, surgical intervention should be carefully considered, particularly from the aspect of control of haemorrhage. Where such a lesion is situated on the distal part of a limb a ligature or elastic tourniquet may be applied above it to prevent haemorrhage during operation. If removal of the lesion by careful dissection is not found to be possible, the limb can still be amputated above it.

In sessile and plaque-like lesions a neck can often be produced by the very slow tightening of a thick silk ligature, which is pressed down round the periphery by an assistant, taking some 10 minutes of intermittent tightening. Even if the tissues are cut by the ligature haemorrhage is seldom serious. Once some form of ligature is applied incision of the apex of the growth can be made and the bulging contents separated by blunt dissection of the covering skin from the main mass. The basal ligature can then be drawn tight and any vessels from the deep face of the mass will be included in it.

Excess skin should then be cut away and an antiseptic powder will aid the sealing of the wound. If the skin itself is involved, or is the site of origin of the tumour, a circumferential incision distal to a ligature will allow clean extirpation. In cases where there is some doubtful residual tissue, cautery with an intramedullary stainless pin or other suitable heat source will destroy it. Cautery should not be used in sites traversed by major vessels or over joints. In large poorly delineated neoplasia, where ligature is impossible and where only partial extirpation is carried out before haemorrhage assumes severe proportions, thermocautery of the wounds and packing with sulphonamide/penicillin powder will check haemorrhage. A week later the blackened, less vascular wound can be re-opened and further removal undertaken. This procedure can be continued until the whole growth is deemed to be removed or destroyed.

Abdominal Swelling

This is probably the commonest clinical condition met in birds. Its causes are manifold and include subcutaneous lipomata, granulomata and other tumours of the abdominal wall ; degeneration of the abdominal musculature with fatty, cholesterol or granulomatous changes leading to prolapse or rupture of the abdominal wall ; distentions due to colonic dilatation with faeces, retained egg or eggs, cystic dilatation of the oviduct, extra-tubal egg or egg material, and peritonitis ; ovarian, testicular, splenic, hepatic and renal neoplasia and hepatic or unidentifiable cysts. This is a formidable list but a good case history and a thorough examination will narrow the field considerably.

Diagnosis and differential diagnosis. Careful enquiry should be directed at establishing the approximate duration of the condition, whether the bird's general health is affected, the state of its appetite and intestinal function, and the diet it has been receiving ; if the bird is female it is useful to know whether she is a recent or a prolific breeder, and whether there is any change in sexual behaviour or in cere colour. Examination will establish the *apparent* sex, whether respiration is affected, the nature and quantity of the droppings in the cage, signs of general obesity, bulging of the cloacal region and caking of the region with faeces. Palpation of the swelling will differentiate thickening of the body wall from prolapse of its contents; fluid and soft intestinal distentions will be distinguishable from firm neoplasms of internal organs and from eggs. Cysts and dilatations of the oviduct are less easy to differentiate from other soft abdominal contents. Care must be taken that the gizzard is not confused with an egg or a neoplasm especially when

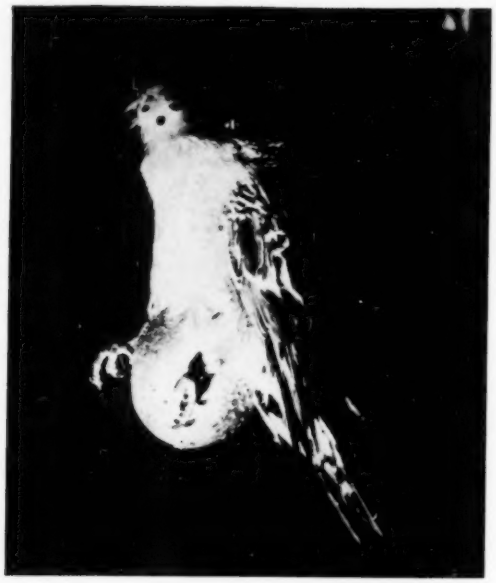
L. ARNALL.—ANAESTHESIA AND SURGERY IN CAGE AND AVIARY BIRDS

FIG. 8.—Advanced chronic cnemidocoptes infestation ("Scaly-face" and "Scaly-leg") in an adult male budgerigar, causing considerable distress, interference with feeding, vision and movement of the eyelids, perching and progression. Curettage and manipulation were required in addition to medical treatment.

FIG. 10.—A 6-year-old female budgerigar showing a dishevelled appearance due to the discomfort associated with an abdominal neoplasm and the misguided lubrication of the vent by the owner who thought the symptoms were those of egg-binding.

FIG. 9.—Canary showing a single large ulcerated dermal cyst (Hypopteronosis cystica) on the flank and anterior aspect of the thigh.

FIG. 11.—Mature female budgerigar showing a huge flaccid abdominal distension consisting of a degenerate fatty attenuated abdominal wall with heavily fat infiltrated viscera and a dilated and cystic oviduct. The thyroid glands were also enlarged. This bird was obliged to perch horizontally to prevent the distension, which represented half the bird's weight, overbalancing it backwards.



FIGS. 12 and 13.—A relatively tense abdominal distension in a 4-year-old female budgerigar. The laparotomy view shows a large nodular ovarian tumour and cyst, granulating attenuated abdominal musculature, visceral adhesions, a rounded liver and a large blood clot.

that organ is displaced by another lesion. (For surgical procedures for the main conditions here considered, the appropriate sections should be sought.)

Acknowledgments.—My grateful thanks are due to Professor J. G. Wright for his constant encouragement, valuable editorial advice and meticulous re-reading of the text ; to Mr. A. C. Shuttleworth for his interest in generously allowing facilities for studying the subject in this Department ; to members of the Department of Veterinary Pathology under Professor D. L. Hughes for their indispensable histological and microbiological investigations; and to Mrs. M. Manchester for her willing and cheerful help in typing the text, largely at very short notice, and to Miss G. Stalker for additional typing.

References

ALBRECHT, J. F., & FORDE, D. L. (1956). *All Pets Magazine.* May. 114. (Quoted by Feyerabend, 1957.)
ARNALL, L. (1958). *Vet. Rec.* **70.** 120.
BICE, C. W. (1956). "Nutrition of the Budgerigar." Proc. Second World Budgerigar Congress. *Budgerigar Bulletin.* **4.** 19.
BRADLEY, O. C. (1950). "The Structure of the Fowl." 3rd edit. Oliver & Boyd, Edinburgh and London.
BRODY, S. (1945). "Bioenergetics and Growth." New York. Reinold.
BUCHANAN, J., & SYKES, A. H. (1960). Private communication.
CREW, F. A. E. (1931). *Vet. Rec.* **XI.** 521.
——, & MIRSKAIA, L. (1931). *Ibid.* **XI.** 541.
EDWARDS, F. B. (1943). *Ibid.* **55.** 64.
FEYERABEND, C. (1951). "Diseases of Budgerigars." Fond du Lac. Wisconsin.
———. (1957). "Your Budgie's Health Book." Fond du Lac. Wisconsin.
FOX, H. (1923). "Diseases in Captive Wild Mammals and Birds." Lippincott, Philadelphia and London.
FRIEDBERGER, F., & FROEHNER, E. (1910). "Veterinary Pathology." Book II. 6th ed. Translated from the German by M. H. Hayes. Hurst & Blackett Ltd., London.
GANDAL, C. P. (1956). *All Pets Magazine.* August. 66.
GRAY, H. (1923). *Bazaar, Exchange & Mart.* Nov., 1923.
———. (1935). *Vet. Rec.* **XV.** 693.
———. (1936). *Ibid.* **XVI.** 343, 377 and 417.
HARE, T. (1931a). *Ibid.* **XI.** 1,009.
———. (1931b). *Ibid.* **XI.** 1,050.
———. (1931c). *Ibid.* **XI.** 1,227.
———. (1937). *Ibid.* **49.** 680.
HENNEMANN, J. (1909). *Ostr. Monatsschr f. Thierheilk.* **34.** 392.
JENNINGS, A. R. (1959). "Bird Ailments and Accidents." Cage Birds. 6th ed. London.
JONES, O. G. (1956). *Vet. Rec.* **68.** 918.
———, & TWISTLETON-WICKHAM-FIENNES, R. N. (1959a). *Ibid.* **71.** 245.
———, & ———. (1959b). "Some Budgerigar Ailments." Budgerigar Bulletin, September 23rd.
JORDAN, F. T. W., SANFORD, J., & WRIGHT, A. (1960). Private communication.
KEYMER, J. F. (1958a). *Vet. Rec.* **70.** 713 and 736.
———.(1958b). "Some Ailments of Cage and Aviary Birds." Paper presented at the First Annual Congress of the British Small Animal Veterinary Association.
MATTHEWS, L. H. (1949). *Ibis.* **91.** 373.
OWEN, R. (1866). "Lectures on the Comparative Anatomy and Physiology of Vertebrates." Vol. II. Birds. Longmans, London.
RATCLIFFE, H. L. (1933). *Amer. J. Cancer.* **17.** 116.
RIDDLE, O., CHARLES, D. R., & CAUTHEN, G. E. (1932). *Proc. Soc. Exp. Biol. N.Y.* **29.** 1,216.
———, NUSSMAN, T. C., & BENEDICT, F. G. (1932). *Amer. J. Physiol.* **101.** 251.
SCHLUMBERGER, H. G. (1955). *Ohio J. Sci.* **55.** 23.
SELLWOOD, E. H. B., MASSEY, D. M., & WATERHOUSE, V. R. (1960). Private communication.
SISSON, S., & GROSSMAN, J. D. (1945). "The Anatomy of Domestic Animals." 3rd. ed. W. B. Saunders & Co., Philadelphia and London.
SNOW, J. (1858) (Posthumus). "On Vapour Anaesthetics in Small Birds and Other Small Animals." Edited by Richardson, B. W. Churchill.
STAFSETH, H. J., THOMPSON, W. W., & GREY, C. G. (1932). *J. Amer. Vet. Med. Ass.* **80.** 80.
STROUD, R. (1943). "Digest of the Diseases of Birds." Marcus & Stroud, Minneapolis.
STURKIE, P. D. (1954). "Avian Physiology." Comstock. New York.
TAYLOR, T. G. (1958). "Feeding Exhibition Budgerigars." 2nd ed. Cage Birds. London.
WARD, A. R., & GALLAGHER, B. A. (1952). "Diseases of Domesticated Birds." Macmillan. New York.
WATMOUGH, W. (1955). "The Cult of the Budgerigar." 4th ed. Cage Birds. London.
WORDEN, A. N. (1947). Editor. The UFAW Handbook on the Care and Management of Laboratory Animals.
———, & TAYLOR, T. G. (1959). *Cage Birds.* **116.** 145 and 167.

ANIMAL HEALTH TRUST FELLOWSHIPS AND SCHOLARSHIPS

Applications are invited for appointments to Wellcome Fellowships for whole time research in connexion with veterinary science or medicine, from any person who on October 1st, 1961 is under 36 years of age and holds the Membership Diploma of the Royal College of Veterinary Surgeons or a good degree in any faculty relevant to veterinary science or medicine in any university in the British Commonwealth and Empire. Applicants are expected to have done some post-graduate work and to provide evidence that they have been able to make arrangements for the satisfactory conduct of the proposed research which must be in the broad field of veterinary science.

A Fellowship may be awarded at an annual value of £850 rising by annual increments of £50. The Fellowship is subject to income tax and carries benefits under the F.S.S.U.; it is tenable for one year in the first instance and by annual reappointment for a further period of two years at the discretion of the Advisory Committee. Election will be made in June, to take effect as from October 1st, 1961. The closing date for receipt of application is Friday, May 12th, 1961. Forms of application are obtainable from: The Scientific Director, The Animal Health Trust, 14 Ashley Place, Westminster, London, S.W.1.

A few Research Training Scholarships are offered by the Animal Health Trust to recent graduates in veterinary medicine or natural science.

These scholarships to the value of £500 per annum will be exempt from income tax and will carry a grant not exceeding £60 per annum towards the payment of essential fees. Applicants must be desirous of entering upon a research career connected with veterinary medicine. Forms of application can be obtained from The Scientific Director. The closing date for the receipt of applications is May 12th, 1961.

Spirocerca lupi (Rudolphi, 1809) as a Cause of Marie's Disease in the Dog

BY
D. J. DUCKER
Cholo, Nyasaland

Introduction

THE large, red, coiled nematode *Spirocerca lupi*, is a serious problem in dogs in the Cholo area of Nyasaland.

The eggs of the worm are passed in the faeces of the definitive host and are ingested by a suitable coprophagous beetle whereupon they hatch and encyst. If infected beetles are swallowed by an unsuitable host the larvae become encysted again. The definitive host may become infected by ingesting the beetles or other animals in which the encysted forms occur.

The larvae are liberated in the stomach, penetrate the stomach wall, and then migrate *via* the walls of the arteries to various sites in the body. The most common sites for the worm to settle are the walls of the oesophagus, the stomach, or the aorta where they stimulate the production of fibrous tumours. Depending on the site a variety of symptoms may be shown. In the aorta sudden death may be the first symptom following rupture of an aneurysm. In the oesophagus a cough may be induced due to pressure on the lungs, and vomition is common. The following case is reported as a rare and interesting set of symptoms were shown.

Subject

Eight-year-old Ridgeback bitch.

Owner's Complaint

Animal limping and forepaw swollen following a fight with an unknown wild animal 2 weeks' previously.

History

The dog had been suffering from a chronic cough for about 2 months and had been becoming thinner for a month. Very occasional vomiting had been noticed in conjunction with coughing spasms. The animal was eating well but had been lame for 2 weeks.

Symptoms

The dog was very thin and reluctant to move. The condition of the coat was fairly good. Temperature, mucous membranes and respiration were normal.

There were swellings on all 4 limbs, these being more marked at the joints; they were confined to the distal ends of the limbs. The swellings were hard and warm, but little pain was shown except when the joints were moved. Articulation was restricted and movement appeared painful in the metacarpal and metatarsal joints.

Auscultation of the chest revealed no abnormalities.

Diagnosis

On the symptoms and history the diagnosis was of hypertrophic osteoperiostitis (Marie's disease) due to some chronic lesion in the chest, possibly tubercular, carcinomatous or parasitic.

Treatment

The possibility of recovery in response to surgical intervention (Rex, 1959) was considered but facilities available precluded thoracic surgery so the owner was informed of the poor prognosis. He appeared reluctant to agree to euthanasia and throat swabs were taken to check for tuberculosis. Two days later the animal was presented for euthanasia —which was carried out. The throat swabs were negative for acid-fast bacilli.

Post mortem

The animal was thin but there was a good layer of omental fat. The spleen was considerably enlarged, otherwise the abdominal cavity was quite normal.

There was a large tumour within the oesophagus reaching from the diaphragm to a point anterior to the heart. The swelling was pear-shaped and about 4" long by 2½" wide at its maximum. The apex of the pear was directed anteriorly and the tumour was wholly within the oesophagus, no other organ being involved in the growth. The lungs showed slight hepatisation at the base of each lobe where the tumour was pressing on them.

When the oesophagus was incised the tumour was revealed as a large mass within the lumen originating in the dorsal wall of the oesophagus. It had a raw necrotic surface, was hard and fibrous, and difficult to cut. It involved the wall of the oesophagus down to the sub-serous layer. The muscular layer and epithelium was missing completely throughout the area of the attachment of the tumour. There were deep cracks in the tumour extending down to the normal connective tissue of the sub-serous layer.

Subsequent histological examination showed the tumour to consist of connective and fibrous tissue.

Examination of the tumour failed to reveal any worms, but beyond its posterior end a small soft lump was seen in the oesophageal wall. A bunch of worms was found within this lump.

These worms were identified as *S. lupi* on size, colour, lip arrangement and arrangement of the poserior end of the male worm (Monnig, 1947).

The dog's legs, when skinned, showed hard calcified masses on the bones, these being particularly noticeable on the radius and ulna. The metatarsals and metacarpals were also severely affected and the tibia less so. There was little involvement of the

humerus and femur. After boiling, these masses were shown to consist of spongy bone material typical of Marie's disease or hypertrophic osteo-arthropathy (Geiger & Davies, 1946).

Discussion

A survey carried out by Fitzsimmons in June, 1957, in this district revealed 100 per cent. infection of the domestic dog with *S. lupi*. This survey was done in conjunction with a rabies control drive and a total of 60 dogs were examined after being shot. these dogs were all village animals which largely had to find their own food. Subsequent examination by the writer in well-fed animals has not confirmed this 100 per cent. figure but nevertheless this condition is very common. Thus any history of a chronic cough is treated with suspicion of this parasite.

This interesting and rare pathological condition of Marie's disease caused by *S. lupi* is the second case of its kind seen by the writer. It is considered unusual that such a large tumour as this did not cause more marked signs of obstruction. However, close questioning of the owner before and after death of the animal showed no more than evidence of occasional vomiting.

Apparent improvement in early cases of spirocercosis in dogs has been achieved by weekly injections of lithium antimony thiomalate* at a dose of 1 c.c. per 50 lb. bodyweight continued for 3 weeks.

Acknowledgments.—My thanks are expressed to the Director of Veterinary Services, Nyasaland, for permission to publish this case record.

References

GEIGER, & DAVIES (1946). *Veterinary Pathology and Bacteriology.*
MONNIG, H. O. (1947). *Veterinary Helminthology and Entomology.*
REX, M. A. E. (1959). *Vet. Rec.* **71**. 409.

* "Anthiomaline": May & Baker.

Clinical Note

An Unusual Case of Uterine Torsion in a Hereford Cow

R. BRADLEY
Winchester, Hants.

Subject. A 5-year-old Hereford cow pregnant 8 months and 1 week.

History. The animal, one of several, was in good condition and was normal when examined by the owner the previous day. All the animals had been observed to gad about that day as they had been especially worried by flies. The following morning the cow was found dead in the field. There were no signs of a struggle. The animal was blown—that is to say, the rumen was distended with gas—but as death had occurred some time previously, this might or might not have been significant.

Examination. A series of blood smears were made from the coccygeal vessels and examined for anthrax. These proved negative.

A *post-mortem* examination revealed a ruptured rumen and ruptured muscles in the region of the sub-lumbar fossa. This condition was thought to have occurred after death as there was no associated haemorrhage, and the hot weather accelerated fermentation and decomposition. The heart showed a few petechial haemorrhages on the epicardium. The most striking feature was a clockwise twist of the uterus of 180°. There were no other lesions of significance.

Discussion. The cause of death is in doubt. The possibility of bloat cannot be ruled out, but it seems unlikely as the pasture is not a rich one and no other cases have occurred either before or since. Hypomagnesaemia is another possible cause but, again, the condition is not a problem on this farm, and this particular batch of animals had been fed 2 oz. calcined magnesite daily for some time. One thing is certain: the uterus had undergone torsion before death and some 3 weeks before the animal was due to calve. There were no signs of impending calving and it was obvious that the calf was not yet fully developed although it appeared normal.

There may be some speculation as to whether the torsion caused death, possibly by embarrassment to the circulatory system. It also poses the question "does the torsion we are familiar with as a cause of dystocia occur just prior to calving or some time before?" I have experienced one case where a diagnosis of uterine torsion was not made for some 24 hours after a preliminary examination, when the condition was undoubtedly present. This had no deleterious effect on the cow.

FOOT-AND-MOUTH DISEASE

Fully realising the danger to her meat export trade, Argentina is now settling down to the adoption of serious measures to combat foot-and-mouth disease says *The Times*.

Regulations and inspection have existed for some years but they were not sufficiently drastic nor adequately enforced. There was a widespread tendency, not yet completely eliminated to pretend that the local *aftosa* was not really foot-and-mouth disease which has cost the United Kingdom so dearly during recent decades. Furthermore, the suggestion that starlings and other birds brought the disease from the continent of Europe was eagerly accepted as evidence that the case against Argentine meat imports was far from proved.

The Government, in particular Dr. Ernesto Malaccorto, the Secretary of Agriculture, is not wasting time on such argument. Dr. Malaccorto has admitted that foot-and-mouth disease is widespread here and has settled down to find really efficient means to combat it.

Vaccination against the disease has been made compulsory in the principal cattle raising zones.

To ensure the application of the regulations, zonal inspectors have been appointed and local committees of breeders and others have been nominated. Where cattle fairs are held, adequate dipping and disinfection facilities will have to be provided.

Experts are being brought in from abroad to advise the Government on vaccines and other ways of combating foot-and-mouth.

SYMPOSIUM *

The Veterinary Profession, Past, Present and Future

3.—The Future

BY

J. G. WRIGHT

Dean of the Faculty of Veterinary Science, University of Liverpool

I FIND the task you have set me a most difficult one. I possess no gift of prophecy, and thus the statements I make can only be based on my knowledge of the profession and the demands made on it to-day, and my assessment of future trends. When one says "the future" one should, I think, have in mind 20 to 25 years hence always assuming, of course, that peaceful co-existence among the nations of the world is maintained, for that is the period in regard to which you young people in our Schools to-day are most interested. A second point to consider is to what aspects of our professional life and work we should direct our thoughts in the short time at our disposal. I have selected agricultural practice. I am quite sure that one of the points you have in mind is your likely prospects from the material viewpoint, and another the opportunities the future will afford you fully to apply your knowledge, skill and experience, and thus the intellectual satisfaction your work will give you.

It is undoubtedly true that the prosperity of agriculture in this country, with which, of course, is linked our professional well-being, is greatest in time of war and in the difficult period immediately succeeding it. During this period in relation to the last war, our profession received a great deal of governmental interest and attention which, as you are aware, culminated in the Veterinary Surgeons Act of 1948. One result of this is that our status in the community has risen, and another has been an abrupt rise in the number entering the profession; for whereas in 1939 there were 3,722 names on our Register (a number which had been relatively stable for many years), in 1960 the number is 6,387, a rise of 70 per cent. In regard to the two major forms of professional employment in the United Kingdom, general practice and whole-time appointments, the proportionate rise has been about equal—general practice from 2,000 to 3,300, and whole-time work from 800 to 1,200. If this rate of increase (now about 140 a year) continues unchanged, I estimate that in 20 years' time the number seeking their livelihood in general practice will be in the region 4,500 to 5,000, an increase of about 50 per cent. on to-day.

You may challenge the premise that the increase will continue at the same rate. I would reply that our existing Schools have been designed and staffed to produce about 220 veterinary surgeons annually, and under the system whereby University education is available to all young people who show they have the ability to profit by it, I think the number of candidates seeking entry to the Schools will be sufficient to fill the available places. At any rate until such time that it has become abundantly clear that there are too many veterinary surgeons. Moreover, as the cost of running our Schools is high (I would put the figure at at least a million pounds per annum, most of which comes from public funds), I do not think we shall be able to resist pressure to fill all available places. It is of interest to note that there has been an abrupt rise in the number of applications for places in this School during the past three years, for whereas the number in 1958 was 180, in the current session it is 340. This is, no doubt, in part due to the "bulge" (the increase in births in the war years) and in part to the "trend" (the increasing number in the schools going on to sixth form studies). While the bulge will subside again, the trend will continue.

During and since the war those of the profession engaged in agricultural practices have been prosperous. The greatly enhanced value of our farm livestock and the very considerable clinical advances which have been made have stimulated a greater utilisation of our services, but in this connexion I would remind you that agriculture is an industry governed entirely by economic considerations and practitioners will only be fully employed as long as it can be seen that it is profitable for the farmer to do so. In this respect there are fundamental differences between the purpose of our profession and that of medicine, a fact which we, and particularly those of us engaged in teaching, must constantly have in mind. The prosperity to which I refer is related in part to the veterinary surgeon acting in his traditional rôle, the attending of large numbers of cases for very small fees and by working long and irregular hours, and in part to the income he received for his services as a local veterinary inspector of the Ministry of Agriculture, especially in relation to the scheme for the eradication of bovine tuberculosis. I estimate that in recent years as much as one-third of the income of many practices has been from the latter source and one of its consequences has been a great increase in the number of assistantships available to new graduates. But with the virtual eradication of bovine tuberculosis, the amount of this work must inevitably undergo progressive reduction, and while it is probable that other disease eradication programmes in which the practitioner will play a part will be sponsored by the Ministry, to suggest that their magnitude will approach that of the tuberculosis scheme would, I think, be wishful thinking. Nevertheless, it must be stated that agricultural practice would still seem to be unsaturated, for the requests for assistants we get in the Schools is still greater than the supply.

Can the profession continue to increase at the rate

* Read at the annual meeting of The Association of Veterinary Students held in the University of Liverpool, January 20th, 1961.

I have foreshadowed and still maintain the standard of prosperity it is reasonable for professional men to expect, under the existing practitioner system? My conclusion is that it cannot and I believe it to be inevitable that over-production with its attendant evils will become manifest during the period I have selected. It must be taken, I think, that the farm animal population will not significantly alter. There will no doubt, from time to time, be fluctuations in the numbers of our pigs and poultry, but it is unlikely that the existing population of our grazing animals, 11½ million cattle and 25 million sheep, will increase. While having regard to peacetime political and economic trends, I think that to maintain its existing prosperity, agriculture will have to function with maximum efficiency and that includes us.

Thus we must ask ourselves, is our usefulness fully utilised by the farming industry to-day; is there room for expansion in regard to the service we give and thus in our numbers? There can be little doubt as to the correct answers. The greatest weakness of the existing system is that it is the farmers who decide when professional assistance is required. Their individual ability to recognise the presence of, and appreciate the significance of, ill-health among their stock varies greatly as also does their inclination to seek our aid when disease is apparent. The farmer has long regarded, and I fear will continue to regard the veterinary surgeon as a person from whom he obtains immediate results, and that payment relates to what is done with the hands, the remedies supplied and the distance travelled. Practitioners have done and are still doing excellent work and it would ill-become me to belittle their effort, but they must recognise that much of it is rendered sterile consequent on their lack of time and facility adequately to investigate and deal with their problems.

In my opinion, the future success of the profession lies in our being able to develop a system whereby we have the opportunity, firstly, to foresee the likely onset of, and prevent the occurrence of, disease, and in this connexion one has in mind nutritional, functional, metabolic and parasitic disorders as well as bacterial and viral ones. Secondly, that we are able to institute curative and control measures as soon as disease makes its appearance, and thirdly, that we are able to apply fully our clinical skill in all those numerous conditions which we classify as surgery and obstetrics, from the commencement. There is nothing more soul-destroying to the keen clinician than to be called to a case too late, yet so frequently this is the case. But to do these things properly often entails lengthy investigation and frequent examination with the assistance of comprehensive laboratory services, from which no immediate return is visible. At other times there is an immediate need of hospital facilities for major surgery and, what is no less important, proper post-operative treatment. Again, a sense of frustration arises from the fact that economics so often prevent the practitioner fully following up his cases and expanding his knowledge and experience thereby. Another weakness of our system is that the variety of species with which we may be called upon to deal, and of the diseases that may affect them, is so great that no one person can be fully expert in all of them and there is thus an inevitable tendency to concentrate on those species in which the value of the individual animal is high and to neglect those in which it is small. Yet, I believe it is in the latter that there will be greater and greater need for our services in the future. Thus there must be increased scope for relative specialisation.

With the progressive eradication of infective disease, particularly low-grade infections such as bovine tuberculosis, for example, the task of the clinician becomes more exacting. This is particularly noticeable to-day in cattle practice, in which the demand for somewhat specialised surgery is becoming greater and greater.

I have long been of the opinion that in its relation with agriculture the profession can attain full fruition only through the medium of a whole-time service which is freely available when required. I am convinced that under the "fee for visit" system the service will always be imperfect. I have given some thought as to whether such a comprehensive service could be developed by the profession itself or by co-operative groups of farmers, but have come to the conclusion that these could do little more than scratch the surface of the problem. I believe it should be a national one, but in the time at my disposal this morning I can make only the briefest reference to its possible structure. My main purpose is to stimulate your thoughts. Unfortunately, the introduction of the word "national" and more particularly "nationalised" tends to provoke a heated political reaction rather than an objective examination of the merits or demerits of the thesis advanced. The vision of a profession controlled from Whitehall will stimulate spirited antagonism in many, and in the case of a profession such as ours, I think such antagonism would be well founded for no service the success of which depends so largely on individual effort and initiative could fully function under direct governmental control. Centralisation inevitably makes for rigidity of system, and while this may serve excellently in the case of notifiable epizootics which must be immediately stamped out, it would be quite unsuitable for the combat of the great variety of conditions which in general constitute veterinary medicine and surgery. Decentralisation, however, would allow of the necessary flexibility and would also make for healthy competition and the discovery, exploitation and reward of talent and industry. There would, of course, need to be some form of central body to ensure co-ordination between the divisions of the service and, in regard to scheduled diseases, with the Animal Health Division of the Ministry.

The remodelling of professional services on a national basis is a profound departure from tradition and one of the most difficult aspects of such a development would be the formulation of its structure. If, however, the profession itself were convinced that such a service was required and took the initiative in its promotion then, I think, a structure could be devised which was generally acceptable.

My own view is that regional organisation should be its essential feature and that the regions, of which there might be some sixty to seventy, should have

very considerable freedom not only in veterinary matters but in the appointment, promotion and, yes, dismissal of staff, also.

As I visualise the matter the front line of the service and its most important force, would be the local clinicians whose forte would be their wide knowledge and experience of the general disease patterns in their areas, their skill as diagnosticians and their ability effectively to deal with routine problems. Behind them would be the laboratory and hospital services together with the pool of specialists (this latter is a word I would have wished to avoid because of the special status which has become linked with it in medicine and my use of it only serves to denote special workers in narrow fields). The encouragement of original observation, detailed case recording, field reviews and post-graduate refresher study should be an essential feature of the regions' policy.

It may be said, "all this is very nice but how is it to be paid for?" I believe that a comprehensive service such as I have outlined is well within the limits of our agricultural economy. At a conservative estimate the value of our farm livestock to-day is £1,000 million. An annual per-capita charge of one per cent. of the animal's value would yield £10 million. I estimate that a service such as I have outlined and employing some five thousand veterinary surgeons would cost in the region of £20 million per year. Would it be too much that half this amount be contributed by the national exchequer? It is not unlikely that some of the existing animal subsidy of £130 million for animal products could be more profitably directed to this end. In closing I would say, there need be no alarm that such a scheme as I have outlined will be imposed on a protesting profession overnight. As I assess political trends, for such a change to come about would require not only the whole-hearted backing of the profession itself but that of of the farming industry also, and I think the latter would necessitate considerable missionary zeal.

The Society of Practising Veterinary Surgeons

Economics Committee Report

The aim of the veterinary surgeon is to give his help wheresoever it is needed. His thought is for the animal who is his patient, and the owner, who is in trouble. The skill and integrity of the practitioner, together with the combined efforts of the profession as a whole, have made this help something for which it is worth asking. There are many who could wish that this was the end of the story. It is not. Somehow, at some time, the practitioner has to be paid for what he does. If the work is well done and help given generously, the client will expect to pay. What then is the fee? Many a Divisional meeting has been held to discuss this matter. As a result either nothing is done or a scale of standard fees is drawn up. This is merely a list of the average fees charged in the district for particular procedures. They are soon forgotten and in a few years it starts all over again.

Now, at last, we have something new. The Society of Practising Veterinary Surgeons have published their *Economics Committee Report*. This makes no attempt to tell us what our fees should be. What it does do is tell us how to find out what it costs to do each case. This is a far more practical answer than anything we have had before. The profession is heavily in debt to those few who gave up so much of their time and thought to this work. There is no intention here to give a summary of the results, for this is a book which all in practice must read. Principals must read it to maintain their practices on a sound footing; assistants must read it to find out how much they must do to pull their weight. The costs quoted throughout the book do not, by intention, attempt to assess the value of skill since this, clearly, cannot be the subject of arbitrary judgment.

Apart from the work of the committee, a number of practitioners gave freely of their time to provide the material for analysis. This consisted of audited accounts and time and distance records of all work done. These were records giving times of departure and times of arrival at each case and the daily mileage. The record of each individual veterinary surgeon covered 10 consecutive days. When all these records had been collected an analysis was made of no fewer than 18,000 separate items of work.

From these figures a great wealth of information has been extracted. Practice costs are analysed under 5 headings: time, travel, lay staff, drugs, and overheads. It is the opinion of the committee that excessive profits should not be made on the sale of drugs. These should be charged at face price, the professional and quantity discounts giving an adequate margin of profit. For this reason the cost of time is calculated so that this item carries all of the practice expenses. Some time is spent each day on administration, stocking up the car, and such like; this is classed as non-chargeable time. Chargeable time is that spent in travelling and seeing cases. The cost of chargeable time must cover all practice expenses. Travel-chargeable time is calculated in such a way as to show the cost of time per mile travelled. Running costs per mile are shown in the audited accounts. The two together show the actual cost to the practice of travelling one mile. This in itself, is most valuable information.

The cost of work-chargeable time is found by assuming that each veterinary surgeon, principal, or assistant, has a salary. The number of work-chargeable hours per day is found from the time and distance records. It is now possible to calculate the cost of this salary per work-chargeable hour. The costs of lay staff and overheads are treated in the same way and expressed as costs per work-chargeable hour.

All of this argument is clear and logical. The text is simple and supported by 41 Tables showing details of the analysis. These Tables are of the utmost value for they give average figures obtained from all the records. These will be a great help to those who do not feel able to make their own analysis of their time distance records.

Everyone concerned in this important work is to be congratulated, and perhaps the secretary, Mr. Alasdair Steele-Bodger, most of all.

Divisional News

THE DUMFRIES AND GALLOWAY DIVISION

The autumn meeting of the Division was held in the Queensberry Arms Hotel, Annan, on November 9th, 1960, at 2.15 p.m. The President, R. L. Bell, took the Chair. Fourteen members and 3 visitors signed the Attendance Book. Apologies for absence were received from 2 members.

Minutes

The minutes of the meeting held at Carlisle on July 6th, 1960, were read and approved.

Matters arising

The Secretary reported the receipt of a further letter from the Area Agricultural Adviser, British Oil and Cake Mills, enclosing a list of the films which were available, together with a suggestion that a date be fixed for the proposed visit to South Cathkin next summer. It was agreed that the Secretary should try to arrange this for a Wednesday late in June, 1961.

Mr. A. B. Kerr took the opportunity to express his regret that illness had prevented him from attending the Annual General Meeting to receive his presentation in person. He wished to tender, once more, his thanks to the Division.

Correspondence

(a) From Mr. G. S. Ferguson in connexion with the Association of Veterinary Food Hygienists.

(b) From the Lakeland Veterinary Association inviting members of the Dumfries and Galloway Division to a dinner dance to be held in Windermere on December 1st, 1960.

(c) From the Ladies' Guild of the Division reminding members of the dinner-dance in Dumfries on November 17th. It was announced that a tombola was to be held at this dance and, on the recommendation of the Executive Committee it was agreed that a donation of £5 should be given to the Ladies' Guild for the purpose of providing prizes.

Membership

It was reported that Messrs. D. F. Hamilton, A. Steele and B. Jeffrey had been elected to membership by the Executive Committee in terms of Rule 9 of the Constitution.

Address by Mr. A. L. Wilson

Mr. A. L. Wilson, Veterinary Investigation Officer, Auchincruive, then showed a large number of coloured slides relating to problems investigated by his Department. He commented on each slide, describing the salient points, and answering such questions as were put to him by members. Mr. Wilson took the opportunity of mentioning some of the rules governing the conduct of Veterinary Investigation Officers, with particular reference to the relationship between the investigation service and practitioners.

A short discussion, ably opened by Mr. J. L. Rodger, then ensued, in the course of which Mr. Wilson was able to amplify many of the points previously touched upon.

A vote of thanks to the speaker was proposed by the President, Mr. R. L. Bell, and there being no other business the meeting then terminated.

THE WESTERN COUNTIES VETERINARY ASSOCIATION

A meeting of this Association was held at the Rougemont Hotel, Exeter, on December 18th, 1960, at 2.30 p.m. The President, Mr. P. G. Steel, occupied the Chair. There were 37 members and 6 visitors present, and 8 apologies for absence were received.

Members stood in silence in memory of two members, Mr. Hugh Frazer and Mr. A. J. Smith, who had died since the last meeting.

Minutes

The minutes having been published, were taken as read, and signed as a true and correct record.

Correspondence

(a) The appointment of Mr. Mather, Oravia, St. Austell, to the Milk Sub-committee of the C.A.E.C. was ratified.

(b) A letter from the Association of Veterinary Food Hygienists was read.

(c) The letter from Mr. Harkness with reference to bulk buying was left on the table at the request of the writer.

Membership

Mr. O. F. Amor (Tiverton) and Mr. A. B. Brook (Blackawton) were nominated, and Mr. J. D. Parkinson was elected to membership.

The Secretary read a letter from Mr. Willing who was absent because of illness, proposing Mr. Barons Nelder and Mr. A. R. Smythe for Honorary Membership. The Secretary supported this proposition which was seconded by Mr. Mather. The meeting elected both gentlemen unanimously.

Mr. Eric Miller tendered his resignation as he had left the district.

W.C.V.A./Nuffield Farm Project

The President then reported on a meeting between the W.C.V.A. and representatives of the Nuffield Farm Project. After discussion a sub-committee was formed consisting of the President, Secretary, Mr. Fincham and Mr. Wilson. It was agreed that the sub-committee should have executive powers.

Reports from B.V.A. Representatives

Reports on B.V.A. Committees were given by Messrs. Atkinson, Pethell, Perkins and Dall.

Mr. Atkinson then explained the Cheshire Swine Fever Vaccination Scheme. It was suggested that the letters "W.C.V.A." should be put on the certificate, and that a small fee should be charged for any extra certificate. Mr. Orfeur then proposed and Mr. Mather seconded that the Cheshire Scheme, coupled with the B.V.A. suggestions, should be accepted with

the proviso that it would be reviewed in November, 1961, and that the word "normal" would be deleted. In the event of the W.C.V.A. being approached by the N.F.U. and/or the auctioneers, the following sub-committees were formed:—

Devon: President, Secretary, Mr. Orfeur and Mr. James.
Cornwall: President, President Cornish Clinical Club, Mr. H. James; Secretary Cornish Clinical Club, Mr. Turnbull; and Mr. Perkins.

Address by Mr. C. D. Wilson

Mr. C. D. Wilson then delivered his address on milking machines and mastitis which was of great interest to the members present. Mr. Maffey showed explanatory diagrams and various examples of teat cups. A most interesting discussion then followed, and the President proposed a vote of thanks which was carried with acclaim.

THE SOUTH EASTERN VETERINARY ASSOCIATION

An ordinary general meeting was held at the Royal Star Hotel, Maidstone, on December 15th, 1960. The President Mr. A. F. F. Britten, occupied the Chair, and 17 members and 4 visitors signed the attendance register. An apology for absence was received from Mr. J. T. R. Evans, of Beckenham.

Minutes

The minutes of the last meeting were read by the Secretary, accepted by the members as an accurate record of the proceedings, and signed by the President.

Correspondence

The following letters were received from the B.V.A.:—

(a) Informing members of the views of Council B.V.A. on the Cheshire Scheme for Crystal Violet Vaccination of pigs.

(b) Giving particulars of steps to be taken regarding the proposed refresher course in meat inspection.

Membership

The following candidates nominated at the last meeting were duly elected to membership: Mr. A. M. Grant (Maidstone) and Mr. P. Richmond (Maidstone). Mr. L. A. Chappell was nominated.

Address by Mr. Oliver Graham-Jones

A most interesting and informative address dealing with "Some observations on the Exotic Pet and its Treatment" was then given by Mr. O. Graham-Jones, M.R.C.V.S., the Veterinary Officer of the Zoological Gardens at Regent's Park. Mr. Graham-Jones commenced by discussing conditions in parrots, budgerigars, monkeys, chinchillas and tortoises, as these were the animals for which his advice was most commonly sought. He dealt with each subject in turn, explaining the best methods of control and examination, the commonest ailments and pathological conditions, and the best methods of treatment.

He followed this talk by showing a number of slides illustrating the points with which he had already dealt. He then showed 2 films of operations conducted in the hospital of the Zoo on animals outside the normal range of the veterinary surgeon engaged in general practice.

The discussion was opened by Mr. Wilkinson, of Ashford, who had kindly undertaken this duty at very short notice. Messrs. McIndoe, de Gruchy, Hanbury, and Ingram raised points of general interest which were ably dealt with by Mr. Graham-Jones.

At the conclusion of the meeting, which had gone on rather longer than usual due to the great interest aroused, the President expressed the hearty thanks of the members to Mr. Graham-Jones, accompanied by the plaudits of all present. Mr. Graham-Jones thanked the members for their appreciation and reminded them that he was always pleased to give any help or advice he could if members had difficulty in dealing with creatures not normally presented to them.

BAN ON IMPORTS OF PIG PRODUCTS FROM SPAIN AND PORTUGAL

The two Agricultural Ministers have prohibited the importation into Great Britain of bacon, ham, salami and sausage casings from Spain and Portugal. The reason is that during the last 2 years East African swine fever, which is a very serious disease of pigs not related to the swine fever existing in this country, has spread from Portuguese overseas territory into Portugal and Spain. The appearance of this disease in Europe has led to a most serious warning having been given by the Food and Agriculture Organisation of the United Nations in association with the International Office of Epizootics of the danger to the European, including the British, pig industries.

The Importation of Carcases and Animal Products (Amendment) Order, 1961, has been made and came into effect on March 4th. This prohibits the importation of bacon and ham, salami and sausage casings from Spain and Portugal. All other dangerous pig products are already prohibited.

HOLIDAY EXCHANGES

Members of the profession on the Continent are making plans for the summer holidays, and the younger members of veterinary families in Britain may be interested in the following request for an exchange.

Mlle. Bru (aged 16) would like to stay "au pair" in London or one of the larger cities, preferably in a school or a small hotel, for the period August 15th to September 15th.

Members of the profession who have accommodation to offer and who would like further details are asked to contact Mrs. E. M. Stobo, of 211 Yarborough Road, Lincoln.

Current Literature

ABSTRACTS

Some Observations on the Use of Synthetic Oxytocin in sows. STRAUB, O. C., & GUTTE, J. O. (1959). *J. Amer. vet. med. Ass.* **135.** 171.

Synthetic oxytocin is now available commercially and is used extensively in human obstetrics. It has advantages over posterior pituitary extract (pituitrin) in freedom from side actions and in consistency of response. The present report is concerned with the use of the synthetic product in the sow.

Most observations were made on the "let down" of milk but the successful use of synthetic oxytocin is described for the correction of "secondary" uterine inertia or cessation of parturition when only a proportion of the litter has been born.

Synthetic oxytocin was effective in eliciting the "let down" of milk in 2 sows whose young pigs could obtain no milk (so-called agalactia). It also promoted milk "let down" in 21 cases of mastitis sufficient to permit hand milking of samples for subsequent microbiological examination. The milk "let down" response to synthetic oxytocin was also studied in 7 normal sows and is described in relation to the duration of the effect, the amount, and the nature, of the milk obtained.

The doses used (5 to 10 units intravenously and 15 to 20 units intramuscularly) were always effective but no relationship between magnitude of dose and amount of milk "let down" was seen. (*This is possibly due to all doses being supra maximal. They are greater than those recommended for this product in the* 1959 *Supplement to "The British Veterinary Codex."*—Abstractor.) R. J. F.

Experimental Studies on the Occurrence of Staphylococcal Antitoxin in the Whey of Cows. DERBYSHIRE, J. B. (1960). *Res. vet. Sci.* **1.** 350.

In cows it was found necessary for irritation of the mammary epithelium to occur before staphylococcal antitoxin was released in significant amounts from the blood into the milk. In view of this, mild mastitis would be expected to occur before the udder itself could be protected by this antibody even with high levels of circulating protective antibody. H. W. S.

Displacement of Bovine Abomasum and Current Methods of Diagnosis and Surgical Correction. BUTTERFIELD, A. (1959). *Mich. St. Coll. Vet.* **19.** 162.

This mature essay by a junior student includes a description of the current surgical technique of the Michigan State University Veterinary Clinic. After careful reposition of the abomasum the rumen is entered and partially evacuated by hand, the reticulum explored and the omasum palpated (and if impacted, massaged) through the right ruminal wall. Finally, a heavy suture is passed through the rumen and ventral abdominal floor and tied exteriorly, with the object of creating a fibrous adhesion.

The Liptak test depends upon the acid *p*H of abomasal contents compared with the alkaline condition of the rumen. Using a 10 ml. syringe and a sterile 4-inch 14-gauge needle the abdominal wall is punctured in the region of the suspected displaced abomasum, visceral fluid aspirated and a small quantity placed on a strip of nitrazine paper. Yellow colouration after 1 minute exposure is considered evidence that the fluid is abomasal, and blue that it is ruminal.

Control of Udder Oedema in Dairy Cows. GOUGE, H. E., SHOR, & JOHNSON. (1959). *Vet. Med.* **54.** 342.

Acetazolamide, a potent carbonic anhydrase inhibitor of low toxicity, causes copious diuresis by depressing the formation of H_2CO_3 in the renal tubule and minimising blood electrolyte changes. Excess quantities of base cations and bicarbonate ions are excreted in copious amounts of water with consequent reduction of oedema.

Of 82 dairy cattle showing pre- or post-parturient udder oedema 38 were treated by the intramuscular or intravenous administration of 500 mg. sodium acetazolamide followed by a twice-daily oral dose of 2 g. soluble powder by food or water medication. In this group 100 per cent. showed improvement and 76·3 per cent. complete recovery, 52 per cent. responding in 1 day only, and 14·8 per cent. requiring more than 3 days. As might be expected, the total recovery rate was significantly higher in post-parturient than pre-parturient oedema (92·6 per cent. as against 36·4 per cent.). The remaining 44 animals received only oral medication at the same rate. Of these 81·8 per cent. showed improvement and 70·7 per cent. complete recovery; here again post-parturient oedema responded more readily to treatment. No side-effects except a mild transitory diarrhoea were observed. It is considered that the 2-g. b.i.d. oral dosage was convenient and consistently effective. J. P.

Differences in Susceptibility of Broad Breasted Bronze and Beltsville Small White Turkeys to Dietary-Induced Pendulous Crop. WHEELER, H. O., REID, B. L., FERGUSON, T. M., COUCH, J. R., & RIGDON, R. H. (1960). *Poult. Sci.* **39.** 263.

A crop condition, similar in appearance to field cases of pendulous crop, was produced in Broad Breasted poults by feeding a purified diet with glucose monohydrate as the source of carbohydrate. A quarter of the birds were affected within 4 weeks. By 10 weeks all showed pendulous crops and about half had died.

Beltsville poults on the same diet did not show pendulous crops, but all had died within 10 weeks. No cases of pendulous crops developed in either breed on a normal type of ration.

In both breeds the dead birds showed crop mycosis, and the authors regard the breed differences in mortality as representing a different response to crop mycosis. E. A. G.

Nutritional Factors Influencing Experimental *Candida albicans* Infection in Chickens. I. Effect of Vitamin A Deficiency. JEOFFERY, S. M. S., & KENZY, S. G. (1960). *Av. Dis.* **4.** 138.

Chickens on normal and on vitamin A-deficient diets were dosed with cultures of *Candida albicans*. Lesions of moniliasis were produced in 10 of 16 birds on the deficient diet but in only 1 of 14 on the normal diet. The birds which developed moniliasis on the deficient diet showed retarded growth rates and most showed nervous symptoms, associated with the presence of mycelia in the brain. Signs of vitamin A deficiency were twice as frequent in the *Candida*-infected birds as in uninfected birds on the deficient diet. E. A. G.

Treatment of Experimental Infectious Sinusitis of Turkeys with Erythromycin. BARNES, L. E., OSE, E. E., & GOSSETT, F. O. (1960). *Av. Dis.* **4.** 176.

Experimentally infected birds were treated by injection into each sinus of 50 mg. of an erythromycin compound.

The more chronic cases tended to resist treatment, as did those infected with 2 of the 6 strains of P.P.L.O. used for the experiment. The other birds showed a good response. E. A. G.

Air-borne Transmission of Foot-and-mouth Disease Virus. FOGEDBY, E. G., MALMQUIST, W. A., OSTEEN, O. L., & JOHNSON, M. L. (1960). *Nord. VetMed.* **12.** 490.

Circumstantial evidence suggests that foot-and-mouth disease has been spread by wind from the mainland of Germany to the Danish islands and in a similar manner to Sweden and Norway from Denmark. In 3 of 4 experiments air-borne transmission of the infection was achieved over a distance of about 10 metres (32½ ft.). H. B.

News and Comment

MR. W. T. ROWLANDS HONOURED

Mr. W. T. Rowlands is seen outside Buckingham Palace with Mrs. Rowlands after the investiture ceremony of February 28th. Mr. Rowlands received the O.B.E. in the recent Honours List.

ZOOLOGICAL SOCIETY RESEARCH FELLOWSHIPS

In May, 1960, the Ford Foundation made a grant of 550,000 dollars to The Zoological Society of London to endow three Senior Research Fellowships and three Junior Research Fellowships in animal reproduction.

The Council of the Society, advised by a committee of eminent scientists, has appointed Dr. Peter A. Jewell, M.A., PH.D., B.SC., Dr. Lorna M. Kellas, B.SC., PH.D., and Mr. D. R. S. Kirby, B.SC., to these Fellowships.

Dr. Peter A. Jewell, who will hold the appointment for 5 years, is at present working at the Royal Veterinary College and will take up his new appointment on May 1st, 1961.

Dr. L. M. Kellas, who is appointed for 3 years, at present holds an appointment in the Department of Veterinary Histology, University of Glasgow Veterinary School, and will take up her appointment with the Society on June 1st, 1961.

THE INTERNATIONAL ASSOCIATION OF VETERINARY FOOD HYGIENISTS

The Third Symposium of the I.A.V.F.H. will take place from May 27th to June 2nd, 1961, at Nice, France.

The main subjects which will comprise the symposium are as follows: Meat (fresh, refrigerated, cooled); Hygiene of Slaughtering, Handling and Transport; Laboratory Examination in Connexion with Meat Hygiene; Biological Examination of Meat Products and Canned Meats; Methods of Inspection of Sea Food, and Control of Heat-treatment of Milk, Eggs and their Products.

Those interested are asked to communicate with Mr. G. S. Ferguson, Department of Veterinary Hygiene and Preventive Medicine, Royal (Dick) School of Veterinary Studies, Edinburgh.

SWINE FEVER CERTIFIED VACCINATION

Most members will be aware of the growth of what has come to be known as the "Cheshire Scheme" for vaccination of pigs with crystal violet swine fever vaccine.

This pilot scheme was commenced in a small way on a local basis, and in spite of efforts by the promoters to confine it to a limited area, it appealed so much to farmers and auctioneers that repeated requests have been made to local groups of veterinary surgeons to agree to participate in similar local schemes.

An appeal was made to the British Veterinary Association by its members to assist in recommending fees which might lead to some degree of uniformity. Recommendations were made, but Divisions have been at liberty to make local arrangements with regard to fees, and also to the time interval between vaccination and the sale of pigs.

Meantime, it must be remembered that the Swine Fever Registered Vaccinated Herds Scheme is still in force. This is a national scheme approved jointly by the B.V.A., N.F.U. and M.A.F.F. In view of the recent announcement by the Minister of Agriculture that it was intended to deal with swine fever by stamping it out, it is clear that the Vaccinated Herds Scheme must be amended and revised. This being so, and since there are to be discussions between the Ministry and the British Veterinary Association in the near future, it might be as well for members not to participate in organising further new schemes for vaccination, but to continue vaccinating privately and under existing schemes. Further information to guide the profession will be given as soon as possible.

OVERSEAS SERVICES RESETTLEMENT BUREAU

In the recent White Paper on Service with Overseas Governments (Cmd. 1193) the Government's policy of giving all possible assistance to former officers of Her Majesty's Overseas Civil Service who wish to seek other forms of employment, whether public or private, was re-emphasised. As part of this policy the Overseas Services Resettlement Bureau was set up in July, 1957. Its functions cover overseas officers retiring from all the overseas territories, but it aims particularly at assisting those officers who retire prematurely from territories where compensation schemes have been introduced.

The Bureau will register on request an officer who has been appointed to Her Majesty's Overseas Civil Service by the Secretary of State for the Colonies or through the Crown Agents for Overseas Governments and Administration, once the officer has retired or given notice of intention to retire from an overseas territory. The Bureau has knowledge of a large number of vacancies for professional and technical officers and is able to put them in touch with prospective employers. It is also able to offer valuable help and advice to individual officers in regard to resettlement problems generally

The address of the Bureau is Sanctuary Buildings, Great Smith Street, Westminster, S.W.1, and the telephone number is ABBey 5047-8.

R.C.V.S OBITUARY

We record with regret the death of the following members of the profession:—

HUSTON, Charles Emerson, Ballyards, Barrow-upon-Soar, Loughborough, Leics. Graduated December 16th, 1913, at the Royal Veterinary College, London. Died November 29th, 1960.

STEELE, Lawson Lamb, L.R.C.P. & S., L.F.P.S., 31 Ridley Avenue, Blyth, Northumberland. Graduated May 22nd, 1907, at the Royal (Dick) School of Veterinary Studies, Edinburgh. Died February 24th, 1961, aged 77 years.

PERSONAL

Births

JONES.—On March 1st, 1961, to Fernie and Ted Jones, Swan Cottage, Hingham, Norwich, a son, Christopher Edward, brother for Nicholas and Penny.

OLORENSHAW.—On February 26th, 1961, to Brenda, wife of Peter Olorenshaw, M.R.C.V.S., at Holmwood House, Wymondham, Norfolk, a daughter, Claire Isabel, sister for Elizabeth.

PHILLIPS.—On February 18th, 1961, to Margaret, wife of J. E. Phillips, Edinburgh, a son.

Marriage

HARRISON—GIBBERD.—On Saturday, February 11th, 1961, at St. John's Church, Putney, Frederick Alexander Harrison, B.V.SC., B.SC., M.R.C.V.S., of Cheadle Hulme, Cheshire, to Rosemary Erica Gibberd, of Putney, S.W.15.

COMING EVENTS

March

15th (Wed.). R.A.V.C. DIVISION. Meeting at the R.A.V.C. School and Stores, Thornhill, Aldershot, 11 a.m.

THE SOUTHERN COUNTIES VETERINARY SOCIETY. Joint Meeting with the B.S.A.V.A. (Southern Region) at the Royal Hotel, Winchester, 7.30 p.m.

W.C.V.A. DEVON BRANCH. Meeting at the Three Tuns Hotel, Honiton, 7.30 p.m.

NORTH OF SCOTLAND DIVISION. Spring Meeting in the Northern Hotel, Aberdeen, 2.30 p.m.

LAKELAND VETERINARY ASSOCIATION. Annual General Meeting at the Fleece Inn, Kendal, 7 p.m.

16th (Tues.). ESSEX VETERINARY SOCIETY. Meeting at the Saracen's Head Hotel, Chelmsford, 7.30 p.m.

HERTS. AND BEDS. VETERINARY SOCIETY. A Meeting of the Society will be held at the Sun Hotel, Hitchin, 7.30 p.m.

17th (Fri.). MID-WEST VETERINARY ASSOCIATION. Meeting at the Grand Spa Hotel, Clifton, Bristol, 7.30 p.m.

18th (Sat.). B.S.A.V.A. NORTH WESTERN REGION. Meeting at the Exchange Hotel, Liverpool, 7.30 p.m.

22nd (Wed.). WARWICKSHIRE VETERINARY CLUB. Joint Meeting with the Midland Counties Veterinary Association in the Regent Hotel, Leamington Spa, 2.30 p.m.

B.S.A.V.A. NORTH EASTERN REGION. Meeting at the Hotel Metropole, King Street, Leeds, 8 p.m.
WEST OF SCOTLAND DIVISION. Meeting at the B.O.C.M. Demonstration Farm, South Cathkin, 2.30 p.m.

SOUTH-EAST MIDLANDS VETERINARY ASSOCIATION. Annual General Meeting at the Franklins Gardens Hotel, Northampton, 7.30 p.m.

MIDLAND COUNTIES VETERINARY ASSOCIATION. General Meeting in conjunction with the Warwickshire Veterinary Club at the Regent Hotel, Leamington Spa, 2.30 p.m.

23rd (Thurs.). WESTERN COUNTIES VETERINARY ASSOCIATION. Annual General Meeting at the Rougemont Hotel, Exeter, 2.30 p.m.

SOCIETY OF WOMEN VETERINARY SURGEONS. Spring Meeting at the School of Veterinary Medicine, Madingley Road, Cambridge, 12.15 p.m.

27th (Mon.). EAST YORKSHIRE CLINICAL CLUB. Meeting at the Talbot Hotel, Malton, 7 p.m. for first annual dinner.

29th (Wed.). LINCS. AND DISTRICT DIVISION. Meeting at the Grand Hotel, Lincoln, 7.15 p.m.

April

8th (Sat.). B.R.X. CLUB. 15th Annual Dinner at the Royal Veterinary College, Camden Town, N.W.1, 6 for 7 p.m.

28th (Fri.). LIVERPOOL UNIVERSITY VETERINARY SOCIETY. Dinner at Reece's Restaurant, 7.30 p.m. for 8 p.m.

MEETINGS OF B.V.A. STANDING COMMITTEES AND COUNCIL

At 7, Mansfield Street, London, W.1.
Wednesday, March 29th
Finance Sub-committee. 5 p.m.

At the Royal Dick School of Veterinary Studies, Edinburgh
Wednesday, April 5th
Veterinary State Medicine Committee. 10 a.m.
Small Animals Committee. Noon.
Farm Livestock Committee. 3 p.m.

Thursday, April 6th
Parliamentary and Public Relations Committee. 10.30 a.m.
Home Appointments Committee. 11.45 a.m.
General Purposes and Finance Committee. 2.15 p.m.

Friday, April 7th
Council Meeting. 10 a.m.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Derbys. Shaw Lane Farm, Marston, Montgomery (Mar. 3).
Durham. Rigg Farm, Lartington, Barnard Castle (Mar. 2).
Norfolk. Laurels Farm, Great Moulton, Norwich (Mar. 2).

Foot-and-Mouth Disease

Ches. Littleton Hall Farm, Littleton (Mar. 2); Meadow Farm, Hargrave, Chester (Mar. 3).
Devon. Court Barton Farm, Thorverton, Exeter (Feb. 28); Lodge Farm, Chulmleigh; Oak Marsh Farm, Alphington, Exeter (Mar. 1); Ford Farm, Chulmleigh (Mar. 2); Lower Hacknall, Burrington (Mar. 3).
Flints. Pentre Back Farm, Dyserth; Rhewl Farm, Waen, St. Asaph (Feb. 28).
Middx. Bush Farm, Slough Lane, Kingsbury (Mar. 1).
Oxon. Wykham Fields, Banbury (Feb. 28).
Salop. Adcote Farm, Baschurch, Shrewsbury (Mar. 2); The Clamp, Mytton, Montford Bridge, Shrewsbury (Mar. 5).
Staffs. Gravelly Bank Farm, Hamstall Ridware, Rugeley (Mar. 1); Levedale Farm, Penkridge; Sandboro, House Farm, Hamstall Ridware, Rugeley (Mar. 2).
Wilts. R.A.F. Station Farm, Melksham (Mar. 3).

Fowl Pest

Bucks. The Caravan, Love Lane, Iver (Mar. 1).
Herts. The Cottage, Wilstone, Tring (Mar. 2).
Lincs. 26 Queensway, Ruskington, Sleaford (Mar. 3).
Mon. White House, Kingcoed, Llandenny, Usk (Mar. 1).
Norfolk. Brands Farm, Felthorpe, Norwich (Feb. 28); Hall Farm, Swannington, Norwich; Manor Farm, and Hen Grave, Swannington (Mar. 2).
Sussex. Grange Farm, Crawley Down, Crawley (Mar. 1).

Swine Fever

Ches. Home Farm, Puddington, Chester (Mar. 3).
Dorset. 89 Western Street, Portland (Mar. 2).
Durham. Cragside Farm, Eastgate, Bishop Auckland (Mar. 1); Lascelles Park, Darlington (Mar. 3).
Hants. Stakes Farm, Bishops Waltham, Southampton (Mar. 3).
Lancs. Mitton Hall Farm, Little Mitton, Whalley, Blackburn (Mar. 2).
Norfolk. Malthouse Farm, West Beckham, Nolt (Mar. 1); White House, Caston, Attleborough (Mar. 3).
Notts. Trent View, North Muskham, Newark (Mar. 2); Hainton House, Harby, Newark (Mar. 3).
Salop. Burcote Farm, Burcote, Warfield, Bridgnorth (Mar. 3).
Somerset. Westover Farm, Drayton, Langport (Feb. 28).
Staffs. Pine Hall Farm, Burntwood, Lichfield (Mar. 1).
Worcs. Knowlefields Barn Farm, Inkberrow (Mar. 1).
Yorks. Sunnybank, Hutton le Hole (Feb. 28); Cherry Tree Farm, Follifoot, Harrogate; Prospect Hill, Burton Pidsea, Hull (Mar. 1); Piggeries, Skillings Lane, Brough; Newlands Farm, Haxby; Poplar Farm, Belton, Doncaster (Mar. 2).

ADVERTISER'S ANNOUNCEMENT

IMPERIAL CHEMICAL INDUSTRIES LIMITED, Pharmaceuticals Division, announce that they are now issuing their new anthelmintic drug, *"Promintic" Injection*, to the veterinary profession only.

Full descriptive literature is available on request.
Presented in multi-dose bottles of 250 ml.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

GENERAL

Turkey "X" Disease and the Labelling of Poultry Foods

Sir,—Having regard to your Editorial, "B.V.A. News" and to the interest in this disease (*Vet. Rec.* 73. Siller & Ostler, 134; Gibson & Harris, 150; and Gibson, 151), at the risk of being tedious, may I be permitted to provide some factual information.

During the last war I was implicated in a project propounded by the Ministry of Food for the extraction of vitamin D from cocoa husk (it was believed to be a relatively rich source of this vitamin). Some tons were ground and delivered to bagging-off silos *via* a conveyor worm which bridged two buildings about 50 ft. apart. I was assured that grinders and silos had been well cleaned prior to using the machinery for the production of poultry foods. However, some days later I was called to a case where growing ducklings were dying like flies. An examination of two bags of the food fed showed it to be pure cocoa husk—it transpired that the conveyor worm had not been cleaned.

The cause of death was acute catarrhal enteritis and a gross digestive upset leading to the regurgitation of bile into the proventriculus. There were no liver lesions. Death was very rapid—the birds just keeled over and died.

Shortly afterwards a client came to the laboratory with a sackful of dead hens. "The best feeders I have, first to the trough." Enquiries elicited that he had purchased some cartons of breakfast cocoa from an Army disposal sale "to eke out his poultry rations because it was rich in protein." The necropsy findings and symptoms of disease pointed to laryngotracheitis and as the diagnosis lay between this and cocoa poisoning, official help was requested. Transmission experiments were negative and feeding experiments were positive for cocoa poisoning. No liver lesions were seen or reported.

From this same disposal sale, chocolate in bars, whirls, and as various sweetmeats was purchased and added to swill for pig-feeding. In every case pigs ate the swill but refused to eat the chocolate. Indeed, it was a memorable sight to see well cleaned troughs after feeding, with intact chocolates pushed to one end of the trough.

There can be no doubt that cocoa and its by-products are poisonous to avian species, but in these experiences liver lesions similar to those of "X" disease were not seen or reported.

Mr. W. W. C. Gibson notes certain exceptions to Dr. Blount's conclusions; I, too, have a case under review where of 500 day-old poults delivered to a customer on January 3rd, 420 had died by January 28th showing all the clinical and *post-mortem* signs of turkey "X" disease. I am assured by the compounders, whose food has been fed exclusively, that no Brazilian groundnut meal was used. Incidentally, I cannot get the same assurance regarding milo!

Rosen, on "Groundnuts and Groundnut Meal" as one of the processed plant protein feedstuffs (Altschull, 1958) reports: "An alkaloid, arachine, which causes temporary paralysis in frogs and rabbits has been reported in groundnut meal. Fed at excessive levels, groundnut meal proves toxic both for rats and dogs. In dogs it can cause a lethal fatty hepatitis. A trypsin inhibitor is present in groundnut meal, manifesting approximately half the activity of the well-known soyabean inhibitor. Solvent-extracted groundnut meal is deficient in lipid factors capable of averting sterility in female rats and retarded testes development and degeneration of the spermatic cord in males. Groundnut meal is a poorly balanced foodstuff, it is markedly deficient in energy-yielding fats and carbohydrates, calcium, sodium chloride, vitamins A and D, and some of the B group, much of its phosphorus occurs as phytic acid."

While at the present time Mr. Gibson may have some substance for his statement that there are few veterinarians able to decide as to the suitability of a ration by looking at a list of ingredients, I would point out that under the Veterinary Surgeons Act, 1948, the profession has been given the custody of animal health. Disease is dis-ease whether occasioned by malnutrition, toxins or microbes. That the profession has few members capable of appraising a ration is all the more reason for labelling poultry foods in order that the practising veterinarian can begin to learn something about rations and their impact on stock and clients.

In the light of the vast amount of published research into nutrition of turkeys there can be no secrecy regarding the basic requirements of this animal. Why, then, attempt to make mumbo-jumbo out of it?

Yours faithfully,
T. BARTON-MANN.

Braust,
Weyhill,
nr. Andover,
Hants.
February 21st, 1961.

Reference

ALTSCHUL, A. M. (1958). "Processed Plant Protein Foodstuffs." Academic Press Inc., New York.

The Future of Animal Husbandry in Overseas Territories

Sir,—In an article under the above title, which appeared in THE VETERINARY RECORD of January 7th, Mr. Wm. Miller asked for comments upon the future animal husbandry organisation in certain overseas territories. No one will disagree with his appraisal of past contributions to the eradication and control of livestock diseases by veterinary officers of the Overseas Civil Service, and there are few who will not support his belief that greater veterinary consideration should have been given to livestock development and improvement schemes in some territories.

In any country where animal diseases are the major problem besetting the livestock industry, most of

the resources of the state veterinary service must be directed towards their eradication and control. By doing this, the service may be in the position of having few resources remaining to devote to other approaches for improving the livestock industry. If it has, these are correctly directed to livestock marketing and meat hygiene. Field officers of the veterinary service may have little time available for any work other than disease control, however much they may wish to exploit to the full their wide training. This necessity to concentrate on disease control may result in neglect by the veterinary service of other parts of the livestock economy of the country, which then are taken over by agriculturists.

Kenya is fortunate in having its animal disease control, livestock marketing, meat hygiene, secondary animal industries, artificial insemination and much livestock breeding under the control of the veterinary department. However, this department cannot be considered to be solely responsible for animal husbandry organisation. I myself do not consider that animal husbandry should be reserved only for veterinary surgeons. Apart from those aspects of the livestock economy already mentioned, animal husbandry includes livestock feeding, and this is second only to disease as the greatest problem besetting the livestock industry in many parts of the world. Livestock feeding, pasture and forage crop production, range management and soil chemistry and physics are interdependent, and problems associated with them frequently require a joint approach by veterinarians, agronomists and soil scientists. Livestock breeding likewise requires a joint approach by veterinarians, geneticists, physiologists and others.

For the organisation of animal husbandry in a country in which animal diseases are of paramount importance, I suggest that there be a Division of Animal Industry in the charge of a veterinary surgeon. This Division should contain several departments, such as a veterinary department headed by a veterinary surgeon, an animal products department and an animal husbandry department. The veterinary department's responsibility should be disease control; the animal products department should be responsible for the organisation of marketing, meat hygiene and animal industries; while livestock breeding, artificial insemination, livestock management, pasture and forage crop production and range management should be the concern of the animal husbandry department. These departments would vary in size according to the relative importance to the livestock industry of the problems which they handle.

Field services at province level should be in charge of a senior veterinary officer of the Division of Animal Industry. Initially, officers of the veterinary department should be in charge of the various districts, although working on a provincial basis there should be officers of the animal products department and the animal husbandry department. With the control of the major diseases in years to come, I envisage officers of the animal husbandry department in charge of certain districts. The senior veterinary officer in charge of a province should be responsible, jointly with his counterpart in the agricultural division, for the operation of agricultural training institutes and demonstration farms, whenever their emphasis is on mixed husbandry.

Research into animal diseases and experimentation with animal products should be conducted in the laboratories of the veterinary department. Animal husbandry research should come under the animal husbandry department and should embrace livestock feeding, pasture and forage crop production, range management, and animal breeding and physiology.

The most radical suggestion I have made is that pasture and forage crop production should come under the Division of Animal Industry; but I have not suggested that these subjects be the responsibility only of veterinary surgeons, nor that the animal husbandry department be staffed entirely by veterinary surgeons. This department must contain workers especially trained in various disciplines, and extension workers with the time to devote their energies to husbandry rather than disease control.

When animal diseases are no longer the major factor besetting the livestock industry of a country, I concede that the Director of Animal Industry need not of necessity be a veterinary surgeon. I realise also that the departmental structure which I have suggested will not result in co-operation to solve all problems affecting the livestock industry unless there exists a will amongst all concerned to work together. The veterinary profession should always welcome working with specialists in related interests in order to enhance the agricultural economy of a country.

Yours faithfully,

P.O. Box 30028, R. A. AYRE-SMITH.
Nairobi,
Kenya.

February 20th, 1961.

The Treatment of Ear Conditions

Sir,—I am quite convinced that a preparation containing paradichlorobenzone, benzocaine, chlorbutol and gammexane, might prove very effective in the treatment of parasitic otitis.

Fifteen years ago I was introduced by a colleague to a method of treatment which I have adopted ever since. So long as it is maintained, 75 per cent. of cases, due to a variety of causes, clear up and remain healthy.

Of the others, 20 per cent. respond to aural resection, while the odd 5 per cent. do not improve with any form of treatment. For those who wish to test the method, it consists of gentle syringing of the ear canal once daily, using a rubber syringe without the application of undue pressure. The employment of ear probes, forceps or swabs is completely forbidden.

The injection consists of lukewarm water, containing a very little white soap, plus a teaspoonful of bicarbonate of soda in each half-pint.

Yours faithfully,

6 Peveril Drive, R. H. SMYTHE.
The Park,
Nottingham.

March 4th. 1961.

Plaster of Paris in Wound Treatment

Sir,—Having received several letters and telephone calls from members desiring further information regarding the use of plaster of Paris in wound treatment, we should like to publish the details.

In dealing with fistulous conditions of the bovine digit we try to ensure that any abscesses present have broken and are draining freely. "Gypsona" plaster of Paris bandages are used and usually four 6-inch bandages and two or three 4-inch bandages are required to make a strong cast; this should enclose both digits and extend to about 4 inches above the fetlock joint. No windows are left.

The bandages may be wound on or applied as slabs, or a combination of the 2 methods may be employed. The application is carried out with the animal chained or haltered. When dealing with hind feet it has been found in almost every case that the only restraint required is a rope fastened with a noose above the hock and pulled over a beam to raise the foot to a convenient height with the fetlock slightly flexed.

Hot water is used in the preparation of the cast in order to ensure quick setting of the plaster. Originally the sinuses were dressed with antibiotic and sulphonamide preparations and gauze was applied to the foot before application of the plaster, but experience has proved that these measures are unnecessary.

After setting of the plaster is complete a clean sack is securely fastened as an outer covering and this can be renewed as required.

Although amputation of the digit can be performed speedily and with little trouble, we feel that the advantages of the plaster of Paris treatment are that cows in advanced pregnancy can be dealt with safely, and at the end of treatment the patient still has 2 claws.

In treating cases of severed tendons and compound fractures antibiotic and sulphonamide dressing of the wound is carried out and gauze is applied, and we endeavour to immobilise the joints proximal and distal to the injury. No window is left and no suturing is undertaken, but systemic antibiotic therapy is carried out for 7 days. "Long acting" penicillin may be used for this. Excellent results have been obtained in these cases in cattle up to 2 years old.

Yours faithfully,

Lechlade, H. FORSYTH.
Glos. A. J. BAXTER.
March 2nd, 1961.

Laminitis

Sir,—Although the number of horses met with in general practice is greatly reduced, the odd case of acute laminitis still turns up.

For a number of years I have treated these cases with mepyramine maleate* and, in the majority of cases, if they are seen early, the results are spectacular. I give an initial dose of 20 ml. intravenously, injecting very slowly. This route of administration is contrary to the makers' advice but, if the injection is given slowly, the only symptom noticed is that the horse invariably sneezes. If given a little too fast, staggering will be produced. A repeat dose in 24 hours produces a complete cure in most cases.

Recently I have had 2 other cases which I think are of interest:—

A 3-year-old Thoroughbred mare had, for a considerable time, been going "pottery" of both forelegs, particularly the near fore. Pain was evinced on percussion with a hammer over the entire hoof area. Rest and cold hosing were prescribed without the mare showing any improvement. X-ray examination was negative. A tentative diagnosis of subacute laminitis was made. Five 10 ml. injections of Anthisan were given intramuscularly at 48-hour intervals for 10 days. At the end of this period the mare was absolutely sound and went back into full training. She is still going well after 6 weeks' work.

A 12-year-old Jersey cow, when standing in her stall, was noticed to be "paddling" on her forefeet; this had been going on for a considerable period. She was unwilling to rest for more than a few seconds on either forefoot. When walking she was definitely lame of both forefeet. Ten ml. of Anthisan were given intramuscularly daily for 5 days. After the third injection the cow stood perfectly normal and was going sound. She is still sound after 2 weeks.

Yours faithfully,

16 Ward Street, A. H. F. ROBB.
Glasgow, C.4.
March 1st, 1961.

* Anthisan.

SCIENTIFIC

A Serological Differentiation of Rinderpest and Bovine Mucosal Disease by Agar Gel Diffusion

Sir,—The differential diagnosis of rinderpest has been complicated within recent years by the recognition of several clinically related syndromes. These include conditions which have been given such names as virus diarrhoea and mucosal disease, each existing as more than one type. In their more acute forms, these conditions are indistinguishable from rinderpest. Walker and Olafson (1947) have demonstrated that there is no cross-immunity between rinderpest and at least one of these conditions, *viz*: virus diarrhoea (New York).

Rinderpest has not occurred in Britain since 1877 but bovine mucosal disease has been described by several workers (Dow, Jarrett & McIntyre, 1956; Huck, 1957; Jarrett, 1958). In Kenya, rinderpest is endemic whereas bovine mucosal disease, in one form or another, has yet to be recorded. It is possible, however, that the latter already exists in that country. It would be important, therefore, to be able to make a rapid diagnosis between these diseases.

Agar gell diffusion tests have been applied in the diagnosis of rinderpest (White, 1958; White & Scott, 1960) and similar methods have been investigated for the diagnosis of field cases of bovine mucosal disease in Britain (Darbyshire, to be published). Accordingly, we have tested antisera to rinderpest

and a mucosal disease against the antigens of these diseases by means of agar gel diffusion.

Sixteen convalescent or hyperimmune antisera to a mucosal disease which had been prepared in cattle were sent by air from Weybridge to Muguga, Kenya. After testing against rinderpest antigens they were returned to this country for retesting against mucosal disease antigens as a control against any deleterious effects of transport. Likewise, 11 hyperimmune antisera to rinderpest prepared in rabbits were forwarded to Weybridge and tested against mucosal disease antigens and then similarly returned to Kenya to be retested.

There were no cross-reactions between the sera and the heterologous antigens and on return, all sera precipitated normally with the homologous antigens.

It is suggested, therefore, that the agar gel diffusion test is of value in the differentiation of a bovine mucosal disease and rinderpest.

Yours faithfully,
J. H. DARBYSHIRE,

Central Veterinary Laboratory,
Weybridge.

R. D. BROWN.

East African Veterinary Research Organisation,
Muguga,
Kenya.

G. R. SCOTT,

East African Veterinary Research Organisation,
Muguga,
Kenya.

R. A. HUCK.

Central Veterinary Laboratory,
Weybridge.

February 21st, 1961.

References

DOW, C., JARRETT, W. F. H., & MCINTYRE, W. I. M. (1956). *Vet. Rec.* **68.** 620.

HUCK, R. A. (1957). *J. comp. Path.* **67.** 267.

JARRETT, W. F. H. (1958). *Vet. Rec.* **70.** 48.

WALKER, R. V. L., & OLAFSON, P. (1947). *Cornell Vet.* **37.** 107.

WHITE, G. (1958). *Nature.* **181.** 1,409.

———, & SCOTT, G. R. (1960). *Res. Vet. Sci.* **1.** (3). 226.

Beta-Globulin Polymorphism in Goats

Sir,—Ashton and McDougall (1958) described the occurrence in goats of 3 beta-globulin phenotypes that they called AA, AB and BB. This finding was based on examination of sera from about 60 animals of the British Saanen breed at the Rowett Research Institute. Examination of some 40 offspring from test matings indicated that beta-globulin polymorphism was a genetically inherited characteristic.

The opportunity arose recently to extend the observations of these authors to goats of other British breeds, assembled for experiments at Compton. The animals examined were pure-bred or cross-bred and represented the Saanen, Toggenburg, British Alpine, and Anglo-Nubian breeds. In all, 302 sera were examined by the starch-gel electrophoresis method employed by Ashton and McDougall.

The occurrence of the 3 phenotypes AA, AB and BB was confirmed, and no indication was obtained of the existence of additional types. The frequency distribution of the phenotypes in the 302 sera was: AA — 128; AB — 121; BB — 53.

Test matings were carried out and the beta-globulin phenotypes of the offspring were determined, as follows:—

Phenotype of parents	No. of matings	No. of offspring	Phenotype of Offspring					
			AA		AB		BB	
			Expected	Observed	Expected	Observed	Expected	Observed
AA x AA	3	3	3	3	0	0	0	0
AA x AB	6	8	4	6	4	2	0	0
AA x BB	5	9	0	0	9	8	0	1
AB x AB	3	3	0·75	1	1·5	1	0·75	1
AB x BB	5	7	0	0	3·5	2	3·5	5
BB x BB	2	2	0	0	0	0	2	2

It will be noted that the phenotypes of the offspring were as expected in all cases except for one animal in the AA x BB group; this animal was of BB phenotype. Retesting serum from this animal and checking its parentage failed to explain this anomalous result.

We wish to thank Dr. K. C. Sellers of the Animal Health Trust, Farm Livestock Research Centre, Stock, Essex, for demonstrating to us the starch-gel electrophoresis technique.

Yours faithfully,
G. C. MILLSON.
I. H. PATTISON.

A.R.C. Field Station,
Compton,
Newbury,
Berkshire.

March 3rd, 1961.

Reference

ASHTON, G. C., & MCDOUGALL, E. I. (1958). *Nature.* **182.** 945.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th February 1961		11	—	3	63	—	49
Corresponding period in	1960	9	—	2	174	—	45
	1959	9	—	—	67	—	41
	1958	7	—	36	32	—	33
1st January to 15th February 1961		38	—	17	329	—	144
Corresponding period in	1960	31	—	7	623	—	139
	1959	21	—	—	147	—	125
	1958	22	—	79	152	—	139